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About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

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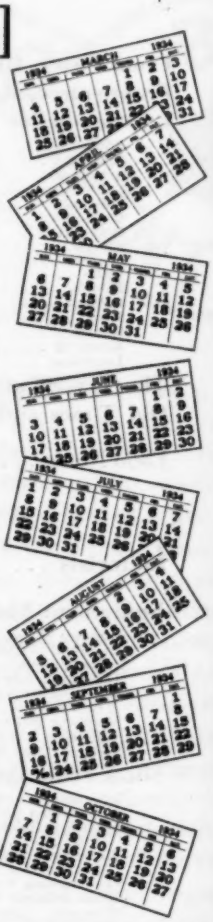
Working by Calendar ... instead of by Barometer!

[Time Economy in Inclement Weather Operation]



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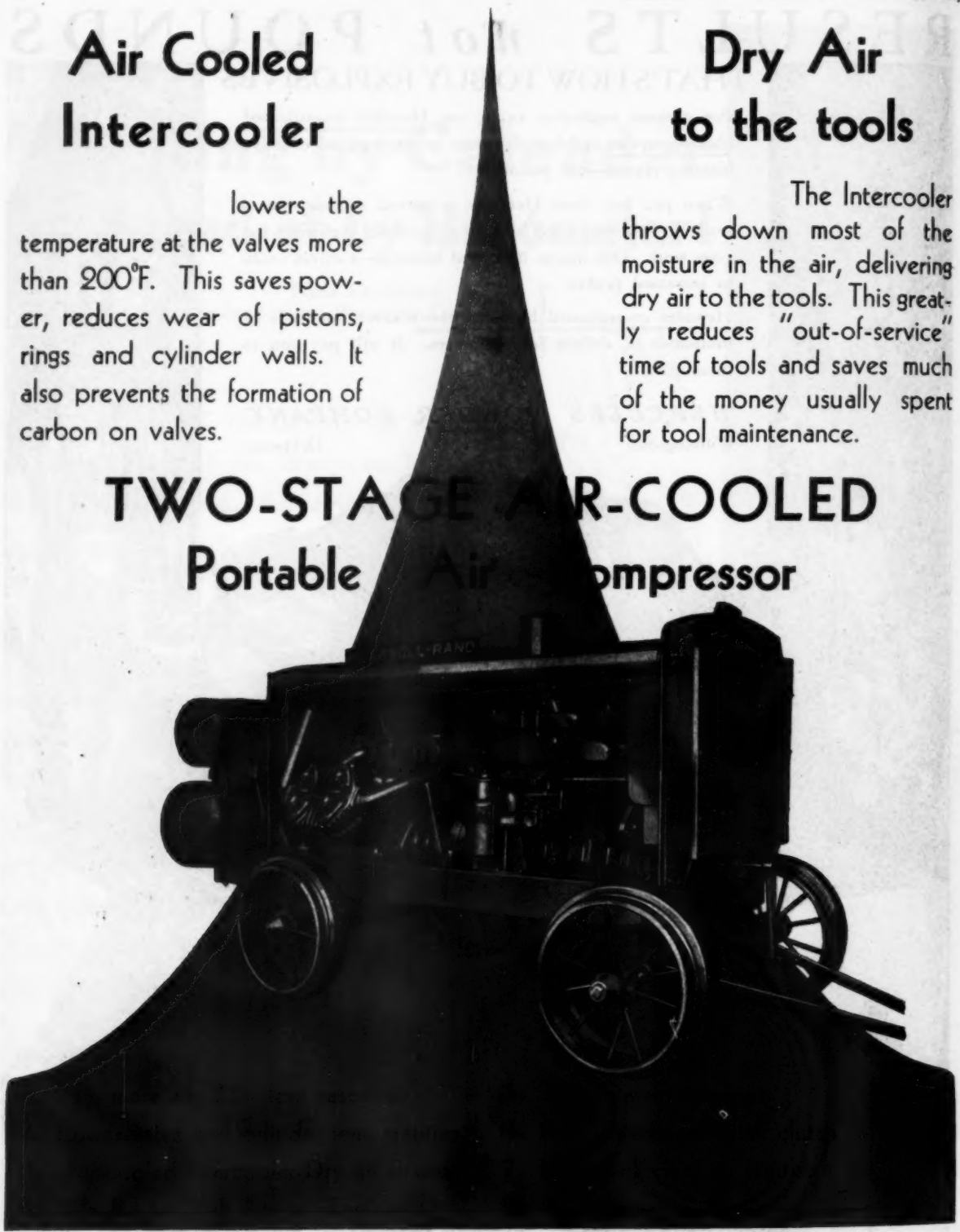

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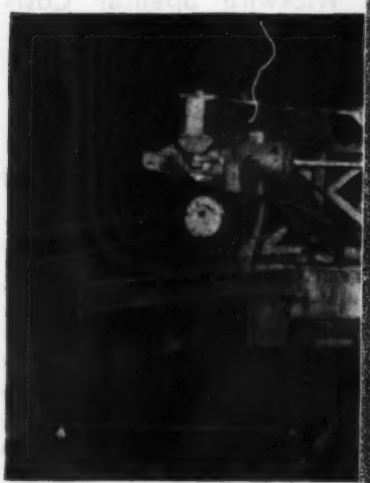

Read about distribution of PW Dollars

Starting Page 20

Interesting charts and figures as presented by The Metropolitan Water District of Southern California to show how the whole nation benefits from construction expenditures on such a project as the Colorado River Aqueduct. Above are shown some recent views of the activities on this gigantic enterprise. Upper left: setting up the drills for tunneling Coxcomb Mountain. Right: A Winston Camp. Center: West Construction Company opening a portal of Whitewater tunnel. Lower right: Opening a Coxcomb portal on Winston Brothers operations. Lower left: Excavating in Whitewater tunnel.

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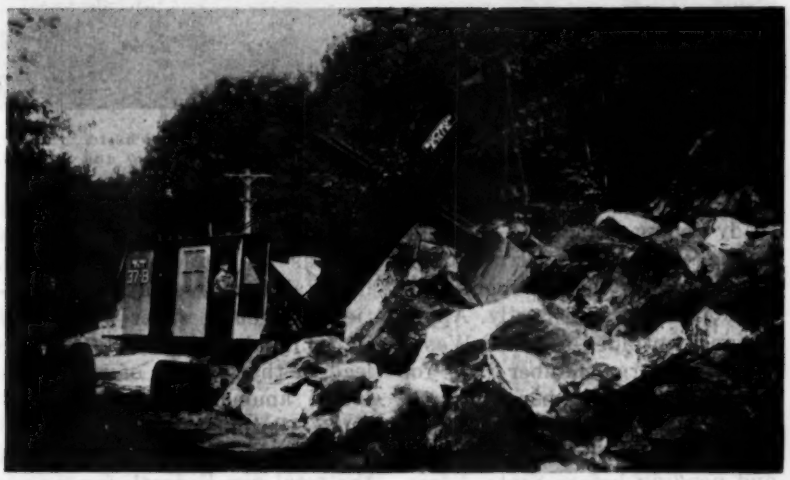


Excavation will play an important part in the extensive construction program involved in public works operations during 1934.

Excavation for 1934 highway construction

Work largely financed by PWA funds. . . . Heavy diversion of highway revenues indicated in many states. . . . Large volume of work carried over. . . . Highway construction will show good increase in most states owing to late start in getting the road building program underway. . . . Active work needed to continue logical highway development.

IN GENERAL, a marked improvement over the conditions of 1933 is shown in this very complete forecast of 1934 highway construction. A stiffening of prices is indicated owing to stabilizing of labor conditions and wages under the NRA, reduction of unemployment, increase of work available in all branches of excavation, reduction of over competition through jobs awarded late in 1933, and carrying over into 1934, removal of conditions which lead many contractors to bid-in jobs below cost.

In considering the volume of highway construction which will be released this coming year it is important to consider that in addition to the 43.2% remaining for new jobs from the amount set aside for Federal Aid highways ($400,000,000) there is also a large volume of highway work included in other PWA allotments such as the $15,000,000 for forest highways, the $10,000,000 for forest roads and trails, the $5,015,000 for public land roads, $1,596,000 for the Alaskan Road Commission, $4,022,000 for Indian Reservation Roads, $24,680,650 for National park roads and trails, as well as highways in conjunction with various irrigation, flood control and power projects together with a long list of loans and grants to various states and cities for highway and street and bridge construction and improvements.

The excavating industry is, of course, vitally interested in all the allotments in the $3,300,000,000 authorized by Congress last June for the PWA. Public Works Administrator Harold L. Ickes announced on December 23rd that, up to that date, allocations have been made from that fund amounting to $3,072,101,203. Included in this, however, are such general allocations as those mentioned above to Federal and State Highways. Letting of contracts has, of course, taken place for a still smaller percentage of this fund.

There remains unallotted $227,898,797. Projects totaling far

Here is a CWA project on a McDonough County Highway near Colchester, Illinois, in full swing. Model "L" Allis-Chalmers tractor and grader cutting and grading.

more than this amount are already being examined by the Public Works Administration and the balance of the allotments will no doubt be made shortly. Applications continued to reach Washington in large number (377 for the week of December 23rd). It is estimated that the applications under examination in Washington and pending before State Advisory Boards call for loans and grants involving a total of $3,500,000,000 of additional funds.

Of the total $3,072,101,203 allotted to over 11,000 projects, $2,413,234,727 has been for Federal projects including the $400,000,000 to the Civil Works Administration and the $100,001,000 to the Public Works Emergency Housing Corporation. For non-Federal projects $658,866,476 has been allotted. This includes money for state, municipality, other public bodies, railroads, housing, relief highway projects and private projects. All non-Federal allotments are secured loans, or loans plus grants with the grants only to non-Federal bodies and never exceeding 30% of cost of labor and materials. Included in the allotments lists as Federal are those for the recovery program of the emergency organizations and funds necessary to carry on the Civilian Conservation Corps to next June 30th.

The largest number of non-Federal allotments have been for water works and improvements to water systems; sewer construction and extension to sewer systems were second. Also involving work for the excavating industry are the low cost housing and slum clearing projects as well as the building of schools, hospitals and recreational facilities. Although water works lead in the number of projects, bridges lead in the amount of money allotted among non-Federal projects. Allotments for bridges and structures account for 28.6% of the total non-Federal, for sewers 21%, water works 12.2%, housing 11.3%, streets and highways 6.1%, schools 5.4%, power plants 5.3%, miscellaneous improvements 4.1%, other buildings 3.3%, hospitals 2.6% and recreational facilities 0.1%. In connection with the housing funds, in addition to the $100,001,000 PWA funds turned over to the Public Works Emergency Housing Corporation, allotments amounting to $48,571,958 have been made to limited dividend corporations for a score of housing and slum clearance projects in a dozen states.

T. H. MacDonald, Chief of the Bureau of Public Roads, who will be one of the principal speakers at the convention of the American Road Builders' Association in Chicago during the week of January 22, said in his report:

"The mileage of Federal Aid road construction during the fiscal year of 1933 was less than the mileage constructed during the preceding year, but it was greater than in any other year.

"For the first time in 17 years the fiscal year ended without definite provision by Congress for continuance of the program for Federal Aid Construction."

Also important to the excavating industry is the railroad allotment of $182,808,000. This includes $51,000,000 for rails and fastenings and $131,808,000 for nine railroads and new equipment and repairs to existing equipment. These funds will mean important activities in the mines and quarries furnishing the necessary raw materials for the large amount of steel involved.

Significant to the excavating industry and having distinct influence on the highway industry because of influence in reducing the amount of equipment and personnel available for competition in the highway field, are the appropriations from Public Works funds to various outstanding projects such as $50,000,000 to the Tennessee Valley Authority; $1,550,000 for the development of Great Smoky National Park; $2,558,803 to the Commerce Department for Aeronautics involving the construction and improvement of a considerable number of airports; $10,000,000 to soil erosion control; $38,000,000 to the Boulder Canyon project; $5,000,000 to Owyhee; $2,700,000 to the Deer-Creek Utah Lake project; $1,500,000 for Moon Lake Reservoir; $6,000,000 for the All-American Canal; $4,000,000 for the Verde River project; $1,000,000 for the Vale project; $12,000,000 for Casper-Alcova; $15,000,000 for Grand Coulee; $18,140,000 for irrigation projects which will bring no new land un-

Gist and Bell encountered heavy rock digging with their Bucyrus-Erie 43-B shovel on the scenic General's Highway connecting General Grant and Sequoia National Parks.

Preserving natural conditions was the byword on the Generals Highway grading job handled by Gist and Bell in California. This highway will eventually connect General Grant and Sequoia National Parks. Two Le Tourneau Angledozers mounted on tractors played an important part in the careful cleanup process. The picture shows a boulder being hauled to its natural position.

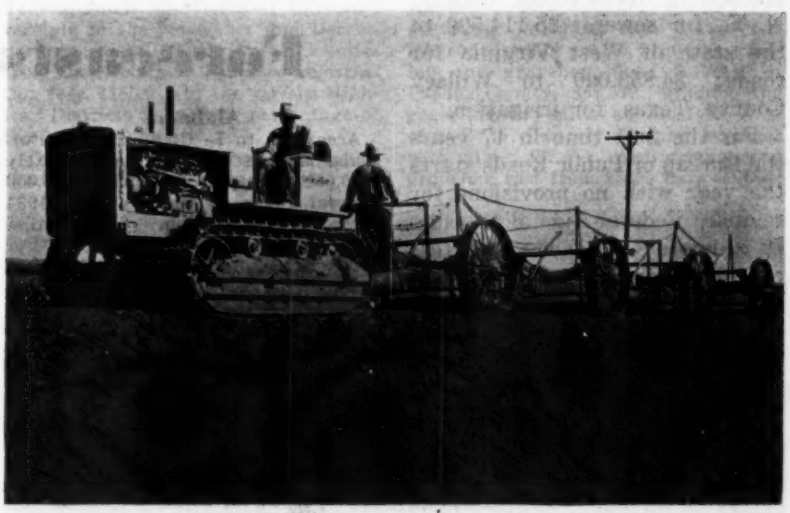
der cultivation; $44,120,000 for flood control on the lower Mississippi; $1,555,000 for the Winooska River Dam; $1,500,000 for the Sacramento River; $81,221,700 for rivers and harbors throughout the U. S.; $33,500,000 for work on the upper Mississippi; $17,753,108 for work on the Missouri; $20,250,000 for Bonneville Dam; $25,000,000 for Fort Peck Dam; $60,152,765 for the Quartermaster Corps for army housing and technical construction; $2,472,000 for Cameron County, Texas, ship canal; $41,948,000 for sewers at Chicago; $8,990,000 for sewers at Cleveland; $7,300,000 for a dam at Columbus, Nebraska; $5,200,000 for sewers at Columbus, Ohio; $3,500,000 for a water project at Denver, Colorado; $7,500,000 for irrigation at Gothenburg, Nebraska; $2,502,000 for water works at Houston, Texas; $1,310,000 for bridge at Jasksonville, Florida; $7,000,000 to the state of Louisiana for bridge across Mississippi River (2.7 miles above Baton Rouge); $6,450,000 to the city of Milwaukee for sewers and water works; $1,648,758 to the state of Montana for highways; $44,200,000 to New York City for bridges; $37,500,000 for a tunnel and $23,160,000 for subway structures; $1,650,000 to Onandaga, N. Y.,

How the NRA Funds Stand in the Various States

THE following tabulation shows the number of N.R.A. Federal Aid projects advertised for contract, the estimated cost of these projects, the percentage of state allotment represented by this estimated cost including funds furnished from other sources than P.W.A., the number of projects awarded and the number of men employed as of December 16th. The tabulation is prepared from information furnished by the Bureau of Public Roads. The figures in this table include both force account and contract work.

State	No. Proj. Advertised	Work advertised P.W.A. Funds	Percentage of Allotment	Estimated Total Cost	No. Proj. Awarded	No. men Employed
Alabama	49	$2,905,000	34.7	$5,055,000	39	1,544
Arizona	29	3,334,000	64.0	3,813,000	26	1,061
Arkansas	51	2,098,000	31.1	2,682,000	35	723
California	99	8,963,000	57.4	11,503,000	73	3,098
Colorado	73	3,530,000	51.3	3,530,000	64	2,869
Connecticut	17	2,730,000	95.3	2,905,000	8	733
Delaware	26	1,116,000	61.3	1,319,000	16	996
District of Columbia	16	1,758,000	91.6	1,766,000	11	998
Florida	52	2,939,000	56.2	3,953,000	49	2,211
Georgia	57	2,042,000	20.2	2,042,000	28	429
Hawaii	11	1,512,000	80.8	1,825,000	11	276
Idaho	68	2,948,000	65.7	2,998,000	64	2,528
Illinois	135	7,636,000	43.5	7,636,000	82	1,013
Indiana	33	3,426,000	34.1	3,431,000	25	1,333
Iowa	128	6,668,000	66.3	7,152,000	122	3,017
Kansas	183	6,489,000	64.3	6,698,000	139	2,699
Kentucky	98	4,467,000	59.4	4,467,000	79	1,716
Louisiana	36	2,706,000	46.4	3,338,000	27	592
Maine	159	2,718,000	80.7	2,813,000	151	4,212
Maryland	25	1,014,000	28.4	1,027,000	6	66
Massachusetts	33	3,397,000	51.5	3,805,000	31	1,553
Michigan	139	7,011,000	55.0	7,063,000	106	963
Minnesota	212	6,360,000	59.7	6,368,000	197	3,960
Mississippi	62	1,332,000	19.1	2,077,000	22	1,045
Missouri	156	5,891,000	48.4	6,410,000	147	4,668
Montana	78	4,700,000	63.2	4,880,000	58	2,536
Nebraska	140	5,427,000	69.3	6,337,000	135	4,673
Nevada	21	2,232,000	49.1	2,252,000	21	1,058
New Hampshire	31	1,394,000	73.0	1,408,000	30	1,364
New Jersey	26	3,180,000	50.1	3,180,000	25	2,110
New Mexico	79	4,134,000	71.4	4,134,000	69	1,680
New York	218	21,030,000	94.2	22,078,000	190	7,645
North Carolina	100	3,152,000	33.1	4,117,000	74	3,026
North Dakota	130	2,830,000	48.8	2,944,000	90	303
Ohio	271	11,372,000	73.4	11,729,000	196	9,368
Oklahoma	75	4,446,000	48.2	4,446,000	66	3,370
Oregon	92	4,025,000	65.9	4,147,000	79	1,228
Pennsylvania	465	14,046,000	74.4	14,173,000	427	15,923
Rhode Island	17	1,368,000	68.4	1,368,000	12	667
South Carolina	75	2,701,000	49.5	2,704,000	53	1,383
South Dakota	94	2,829,000	47.1	2,964,000	65	1,551
Tennessee	63	3,626,000	42.7	4,201,000	39	1,454
Texas	350	12,154,000	50.1	15,173,000	252	13,735
Utah	83	3,191,000	76.1	3,193,000	76	1,284
Vermont	49	1,481,000	79.3	1,516,000	45	1,601
Virginia	113	4,043,000	54.5	4,174,000	65	3,729
Washington	76	3,816,000	62.4	3,834,000	63	1,375
West Virginia	69	2,797,000	62.5	2,820,000	49	1,597
Wisconsin	120	5,810,000	59.7	5,881,000	112	2,086
Wyoming	88	3,112,000	69.1	3,298,000	83	1,417
Totals	4,870	$223,886,000	56.8	$242,632,000	3,932	130,566

Note: Figures include Force Account Work. "Estimated Total Cost" includes other than PWA Funds.



Laenna Township in Logan County, Illinois, used the above Caterpillar Diesel 50 tractor to pull four Insley-Hercules 1-yard scrapers on state-aid work four miles south of Chestnut. The reported cost per 10-hour day is approximately $1.40.

"It is significant" stated H. C. Whitehurst, President of the American Road Builders' Association, "that while there are 147,000 miles of paved roads in the United States, there are only 868,000 miles of the main highway systems that have been improved in any way and 2,172,000 miles which have never been touched by the road builder. It has been found that driving on a paved road is 2.8 cents per mile cheaper than on a mud road, while an all-weather highway is one cent per mile cheaper than an unimproved one. Thus, if the state highway systems were improved in their entirety, the saving to the general public would amount to $1,820,000,000 per year. This figure may be compared with the amount spent for construction and maintenance of all classes of roads, both city streets and rural highways, in 1930, which was $1,543,769,064."

In Hawaii modern methods speed the progress of highway work. For this stiff road job through rock, hardpan and dirt at Kula, Maui, the Hawaiian Contracting Company used a Bucyrus-Erie 1¼-yard Diesel. Tractor-drawn Euclid wagons on the receiving end.

for sewers; $2,600,000 to Pecos, Texas, for irrigation; $11,900,000 to Penna, N. J., for a shuttle line; $1,029,000 to Peoria, Illinois, for sewers; $2,550,000 to Reading, Pa., for sewer supply; $1,490,000 to Rochester, New York, for schools; $11,700,000 to Sacramento, Calif., for water supply; $1,500,000 to Salem, Oregon, for water supply; $1,430,000 to San Antonio, Texas, for sewers; $2,695,000 to San Francisco for water supply and also $1,400,000 for hydro-electric plant; $2,996,000 to Secaucus, N. J., for a hospital; $1,650,000 to South Omaha, Nebraska, for a bridge; $1,385,000 to Springfield, Illinois, for water supply; $1,000,000 to Tacoma, Washington, for a reservoir; $2,100,000 to Westchester County, N. Y., for sewers; $5,114,500 to the state of West Virginia for roads; $4,853,000 to Willacy County, Texas, for irrigation.

For the first time in 17 years the Bureau of Public Roads starts the year with no provisions for regular Federal-Aid allotments. It is hoped that when Congress considers appropriations for the next fiscal year starting July 1st, 1934, a suitable appropriation for this important work will be made. The carry-over of Public Works Funds devoted to highway construction will fill the gap to a large extent with a large number of spring lettings. The following state forecasts indicate that the highway industry may expect material improvement in 1934 as compared with the almost total stagnation of 1933. However, until the states discontinue the almost universal raiding of their gas tax and auto license revenue for various other-than-highway purposes the motorists of the country will continue to be robbed of highway safety, comfort and capacity. Regardless of the need or the good purpose to which such diversions are applied society does not consider them justified in the case of individuals or corporations, nor can they be justified in this case. Highway users are willing to pay for what they get. They have a right to protest and should protest when they are called on to pay for general expenses of government from which they receive no more benefit than anyone else.

Forecasts by States

Alabama

According to L. G. Smith, Director, Alabama can expect approximately $500,000 of State funds plus $7,345,000 Federal funds to go into new 1934 highway construction. In addition State funds will provide $1,900,000 for maintenance. Besides this $4,180,000 of uncompleted construction is carried over into 1934. This brings the total highway expenditures for Alabama during the new year to $13,925,000 which means a new deal for Alabama contractors and will bring a new deal to Alabama motorists.

The tentative program for new construction includes $1,700,000 for 52.4 miles of P. C. concrete; $15,000 for one-half mile of brick, $50,000 for 2.1 miles of bituminous concrete; $1,700,000 for 96.2 miles of bituminous mix; $2,500,000 for 217.3 miles of bituminous surface treatment; $90,000 for 124 miles of gravel; $880,000 for 58.7 miles of grading; $300,000 for bridges; and $110,000 for miscellaneous expenditures.

The hold-over work includes $1,500,000 for 60.1 miles of P. C. concrete; $800,000 for 32.7 miles of bituminous concrete; $1,380,000 for 92 miles of bituminous mix; $330,000 for 33 miles of bituminous surface treatment; and $170,000 for 16.7 miles of grading.

During 1933 Alabama completed 136.6 miles of 20-foot concrete costing $22,470 per mile; 29.3 miles of 20-foot 5-inch bituminous concrete costing $21,430 per mile; 37.8 miles of 20-foot 2½-inch bituminous mix for $11,290 per mile; 1.6 miles of 20-foot bituminous surface treatment for $26,500 per mile; 46.3 miles of grading for $9,850 per mile; and bridges costing $478,492.

Arizona

As of December 16th Arizona had offered contracts for 64 per cent of her PWA allotment. 26 projects had been awarded and 3 were advertised, making a total of 29 to cost $3,813,000. Of this amount $3,334,000 was furnished from PWA funds.

Arkansas

Uncompleted contract work carried over into 1934 will approximate $3,000,000.

Under the provisions of the National Recovery Act, the State of Arkansas was apportioned $6,748,000. To this sum approximately $600,000 of normal Federal Aid was added, making a total sum available in the Fall of 1933 of approximately $7,300,000. Of this amount, approximately $3,000,000 will be placed under contract by December 31st, 1933, leaving approximately $4,000,000 for construction work during the 1934 period.

The State has no available funds for construction and therefore all construction work will be with sums made available under the provisions of the National Recovery Act. Unless further sums are made available by the next National Congress, the 1934 construction program will not exceed this $4,000,000.

This program will consist of grading and gravel surfacing, bituminous surfacing, Portland cement concrete paving and major bridge structures.

According to W. W. Zass, Chief Engineer, Arkansas had completed as of December 1st, 8,810 miles of its state highway system and had under construction or committment an additional 225 miles, making a total of 9,035 miles. Types of road included are: 985 miles of concrete pavement, 555 miles asphaltic pavement, 472 miles asphaltic retread, 5,302 miles of gravel, 818 miles graded earth, 725 miles of unimproved highway and 177 miles through towns and cities, not classified.

"While it is true that the Public Works Administration has granted $400,000,000 for highway construction this year", said Charles M. Upham, director of the American Road Builders' Association, "the definite continuation of Federal Aid is vitally necessary to the highway program of the nation. The present funds are given to the states primarily as an unemployment relief plan without any reservations. The Federal Aid requirements which the Federal government has put on its highway fund contributions has gone far in the past to keeping the improved main highways of the country at a high standard of construction and maintenance. Should the plan be abandoned now it will mean the loss of uniformity in maintenance and the loss of co-ordinated planning.

"The Federal Aid system was devised to provide for a connected and maintained national system of highways. Mail carriers use more than a million miles of highways a day and if these roads were all improved the cost of operation of their machines would be reduced some $6,000,000 a year."

California

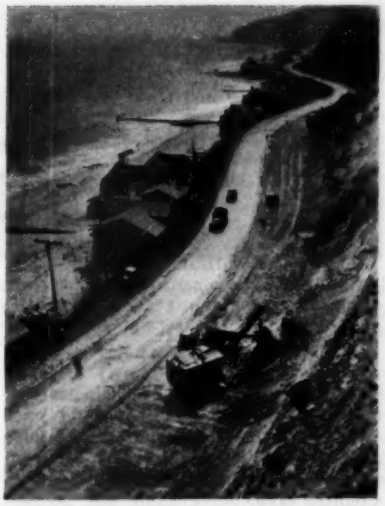
No program has been worked out for the calendar year 1934 as all work is done on a basis of a biennial budget. The revised budget for the 85th and 86th Fiscal Years, covering the period between July 1, 1933 and June 30, 1935, is based on the proposed receipts of $15,607,354 from the U. S. Government for National Recovery Highway funds, $48,180,000 from the gas tax of two cents, $5,356,000 from motor vehicle funds and $600,000 from the transportation companies for tax on transportation loads, making a total of $69,743,354.

In this highway budget the major project allocation totals $34,352,438 of which on December 5, 1933, $13,900,000 of work has been placed under way, amounting to 98 miles of Portland cement concrete or asphalt concrete pavement, 136 miles bituminous treated crushed rock surface, 37 miles untreated crushed rock surface, 144 miles of grading, 442 miles of shoulder oiling, applying seal coat, etc., and 47 bridges. Work on the remainder of the budget will be rapidly placed under way and it is anticipated by C. H. Purcell, State Highway Engineer, that the majority of the work will be under contract in the early part of 1934.

Colorado

A special session of the legislature is convening at the present writing and it is therefore difficult to forecast accurately the Colorado Highway Program for 1934. However, the State Highway Department budget, based on the estimated funds available in accordance with present revenue provisions, has recently been submitted to Governor Edwin C. Johnson, and contemplates expenditures of: $3,650,000 of State funds, about $7,000,000 of Federal funds, $1,117,378 of estimated receipts in the November and December revenues, $155,000 by the Counties from their share of the auto registration fees, $155,000 by the various Highway Districts from their percentage of the gas tax funds.

The expected State fund of $3,650,000 comes largely from the gasoline tax



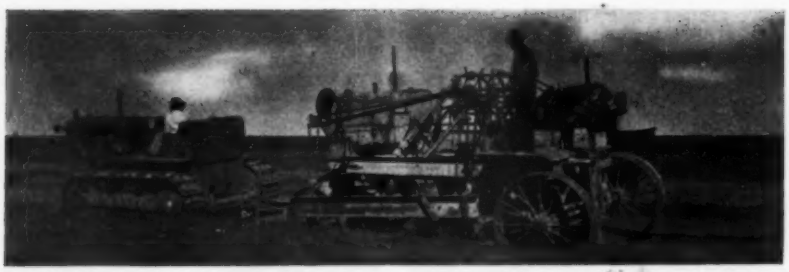
Widening the Roosevelt Highway between Santa Monica and Malibu Beach; S. H. Palmer and J. P. Holland, San Francisco contractors, handled the job.

of which 70 per cent ($3,600,000 estimated) is set aside for use of the Highway Department.

According to Senior Assistant Highway Engineer O. T. Reedy, it is probable that about one-half of this State money or $1,789,000 will be used on State projects on the Federal Aid System; $1,600,000 is expected to be required for maintenance; about $50,000 will be needed for surveys; about $20,000 will go into traffic signs and census; about $20,000 into property and equipment; $25,000 into compensation insurance, while the expense of the administration is expected to be $146,000.

Among the principal State projects contemplated for the coming year are: grading and graveling on Road 4 from Eagle to Gypsum in Eagle County, $120,000; grading and graveling on Road 12 from Yetta to Delhi in Las Animas County, $128,000; grading and graveling 3½ miles near Howard in Fremont County near 6, $100,000; grading and graveling Road 6 West of Pueblo County, $54,572; grading and graveling two miles on Road 16 West of 9-B in Larimer County together with oiling, $29,571. Also grading and graveling east from Estes Park Village

Lundin Brothers on a Minnesota road job using Allis-Chalmers Model "L" Tractor hauling Euclid Wagons loaded by a Bucyrus-Erie 1¼-yard gas shovel.



N. M. Monahan operated this Caterpillar Seventy-Five Diesel with Caterpillar elevating grader on a Colorado State Highway Project near Huxtan for five or six dollars a day. The former costs for gasoline operation amounted to more than $25.00.

in Larimer County for $50,000; grading and graveling in Moffat County east from Utah line on Road 2, $176,000; grading and surfacing road 14 from Paoli east to the state line in Phillips County, $115,000; grading and surfacing on Road 81 in Weld County between Keenesburg and Hudson, $90,570.

Of the $1,117,378 estimated receipts of the State Highway Department for November and December, about $221,555 will be expended on state construction projects.

Excavating Engineer does not have available at this time the contemplated use of the $7,092,086 of Federal funds available for use in Colorado. However, $3,176,375 will be used on NRH projects; $1,656,176 on NRM projects, $1,718,632 on NRS projects and $540,902 under the Emergency classification.

Connecticut

The State Highway Department expects to have available for highway construction during 1934 some $16,000,000, an 81 per cent increase over 1933. $3,500,000 of this will come from Federal Public Works apropriation for highways, $7,500,000 from State appropriations and $5,000,000 from other sources. Figures are approximate and depend on approval of projects by the PWA board.

Delaware

$2,200,000 is expected to be the amount available for Delaware's highway program in 1934 according to Samuel Knopf, Principal Assistant Engineer. $200,000 will be from Federal Aid funds, $1,000,000 from NRA, $1,000,000 from State gas tax and vehicle licenses.

Types of construction planned for 1934 are as follows: grading 13 miles of dual roads estimated to cost $180,000 and involving 300,000 yards of excavation; 40 miles of grading for construction and widening to cost $40,000 and requiring 100,000 yards of excavation; 200 miles gravel and crushed stone surfacing to cost $600,000 and requiring 150,000 yards; 20 miles oil treatment for $40,000; 25 miles high-type paving estimated at $500,000 and involving 100,000 yards excavation; 25 miles low-type paving to cost $25,000 and requiring 25,000 yards excavation; 3 bridges estimated to cost $100,000.

In addition Delaware will carry over into 1934 200,000 yards of excavation on uncompleted contracts to cost $140,000. Mr. Knopf states that, due to unemployment, most of the yardage, especially on the dual roads, will be moved by hand-labor methods, use of machinery being restricted by the specifications.

Florida

Florida expects to have very little money to carry on new construction during 1934. The majority of the money available from Federal Aid and Emergency Federal Relief has been recently awarded and actual construction of practically all these projects will be carried over into 1934. New construction under these heads will be approximately $5,500,000 with an additional $700,000 from state gas tax funds. The department expects, according to W. M. Boozer of the Plan and Survey Division, some $5,000,000 income from the 1934 state gas tax but a great portion of this will be required to pay off indebtedness and to carry on maintenance work.

Georgia

Georgia will have available for construction approximately $10,000,000 from Emergency Federal Aid, and approximately $5,000,000 of State Funds, which is a slight increase over the funds available during the present year. Of this total fund, approximately $5,000,000 will be expended for grading, and the remainder for surfacing and bridges according to E. N. Seymour, Office Engineer.

From a total apportionment of $50,000,000 by the Public Works Administration, $10,000,000 will be spent by the Forest Service on forest roads and trails, $15,000,000 for forest highways and $5,000,000 for roads through public lands, the two latter classifications to be supervised by the U. S. Bureau of Public Roads.

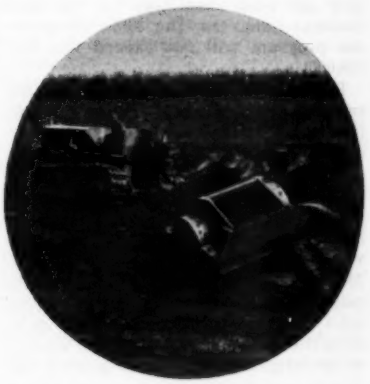
States receiving the larger apportionments for forest highways include California with $2,351,177, Oregon, $2,186,449 and Idaho, $1,710,825.

Idaho

J. H. Stemmer, Director of Highways, informs us that Idaho expects to spend about $2,040,000 for highway construction during 1934. The National Recovery Funds will contribute $1,310,000 of this while $500,000 will come from State revenues and $230,000 from Federal Lands funds. The total in sight (which may, of course, be increased by additional appropriations by Congress in the form of Federal Aid of one kind or another) shows a decrease of about 43 per cent from 1933.

It is probable that 1934 work will include $640,000 for gravel or crushed stone surfacing on 74 miles involving some 570,000 yards of excavation, $160,000 for oil treatment on 39 miles also involving some 80,000 yards of excavation, $200,000 for high grade paving on 4 miles requiring 40,000 cubic yards of grading, and $540,000 for bridges and grade separations involving 120,000 cubic yards excavation. Carried over on existing contracts is 800,000 yards of excavation which will cost (for grading only) about $265,000.

Illinois



Contractor Willis Rowe of Bloomington, Illinois, was working southwest of Carlock building one of the state-aid roads and diverting a creek channel when the above photograph was taken. The outfit consists of a big Caterpillar Diesel 75 pulling a Shaw scraper. Mr. Rowe reports fuel consumption of 30 to 35 gallons of Diesel oil per ten-hour shift and costing 7c per gallon.

Ernst Lieberman, Chief Highway Engineer of the Department of Public Works and Buildings, wires that Illinois will probably have a total of about $30,000,000 for the 1934 highway program. Of this about $17,500,000 will come from the balance remaining of the National Recovery Act funds allotted to Illinois. With the thirty million, Mr. Lieberman expects to grade about 50 miles of highway, to gravel 285 miles, to lay high type paving on 490 miles, to build 80 grade separations, 100 small bridges and 5 large bridges over the Illinois River. This program includes work on the State primary system, city streets and secondary roads.

Indiana

The State Highway Commission forecasts a 1934 program which will be the largest in 14 years. Indiana expects to spend $18,000,000 on construction and $6,000,000 on maintenance and operation. Of the $18,000,000, according to John Wheeler of the Indiana State Highway Commission, NRH will furnish $4,700,000, NRM $4,800,000, NRS $500,000 and the State funds $8,000,000.

Iowa

Uncompleted work under contract at the close of the year totals ninety miles of paving and ninety miles of grading according to a wire report from E. W. Blom of the State Highway Department. The estimated cost of the balance of the National Recovery Program will be $5,500,000 and includes 35 miles of paving, 188 miles of treated gravel, 31 miles of gravel, 275 miles of grading, 25 crossing eliminations and 10 special bridges. In addition it is estimated that there will probably be available for 1934 construction about $1,500,000 of State funds for which no detailed program has been developed pending Federal Aid developments.

Kansas

By January first, Kansas will have under contract the entire program of allotted National Recovery funds, amounting to $10,089,604. State Highway Engineer W. V. Buck advises, however, that the State has placed an application with the Public Works Administration for a loan, including a grant, of $22,400,000. This loan is contingent upon the satisfactory opinion by the Kansas Supreme Court on special legislation passed permitting the loan and then, of course, subject to satisfactory consideration by the Public Works Administration.

Kansas will have only a limited amount of construction work originated from state funds.

Kentucky

Ben Johnson, Chairman of the Kentucky State Highway Commission, wires that a forecast of appropriations for the 1934 highway fund would be too indefinite at this time to be of any value. However, Kentucky has $7,500,000 of NRA funds covering work which should be well under way in the early part of next summer. Contracts have already been awarded for $3,928,000 under this fund leaving about $3,572,000 for NRA lettings early in 1934.

Louisiana

As of December 16th Louisiana had committed 46.4 per cent of her PWA funds. This represents use of $2,706,000 of Federal funds and $632,000 of State funds on 36 projects, 27 of which had been let and the other 9 advertised. Because of late letting much of this work will actually be completed in 1934.

About $3,126,000 of Federal funds are left available for 1934 lettings and will be used with such State funds as may be made available.

In regard to the highway funds provided by the National Industrial Recovery Act under the Public Works Sections, the Bureau of Public Roads reports that on December 16th the estimated cost of work under construction amounted to $148,555,000 of which $134,451,000 was being handled under contract while $14,104,000 (or less than 10 per cent) was being done by day labor employed directly by the Highway Authority.

130,566 men were employed directly on these projects as of December 16th. Of this number 102,636 were working on 2,053 contracted projects while 27,930 were working on 582 projects on which labor is employed directly by the Highway Authority.

Of the total of 4,870 projects estimated to cost $242,632,000 there have been awarded 3,932 projects at an estimated total cost of $203,224,000.

As of December 16th there have been obligated under contract or on projects being handled by day labor or for work advertised for contract 56.8 per cent of the total of $400,000,000 provided under Section 204 of the National Industrial Recovery Act. This leaves 43.2 per cent of the fund or $172,800,000 to be used for awards and new force account projects during 1934.

The work reported as completed up to December 16th totaled only 365 projects involving a total expenditure of $9,562,000 indicating a large percentage of the work already awarded will be carried over into 1934.

Maine

It is impossible to make any forecasts of the amount of work that will be done in this State this year. Practically all of Maine's NRA funds are under contract. There remains of this fund about $1,600,000 to be expended on highway construction. There are about 70 miles carried over. Of this 70 miles, contracts have been awarded for all but about 9 miles, according to R. M. Page, Office Engineer.

Maryland

H. D. Williar, Jr., Chief Engineer of Maryland's State Roads Commission, wires that their highway construction schedule for 1934 provides for expenditure of approximately $10,500,000. This will be provided by $3,500,000 in an outright Federal grant, $5,500,000 of state funds and $1,500,000 from the Federal government on a 30-70 match by State funds.

Massachusetts

A. W. Dean, Chief Engineer of the Department of Public Works, advises that plans for 1934 are too indefinite to even try to forecast.

As of December 16th Massachusetts had awarded or advertised a little over half of the Federal funds allotted for highway construction on 33 projects to cost, including State funds, about $3,805,000. Much of this work will be carried over into 1934. For new lettings there is available some $3,000,000 of PWA money with such additional State funds as may be made available.

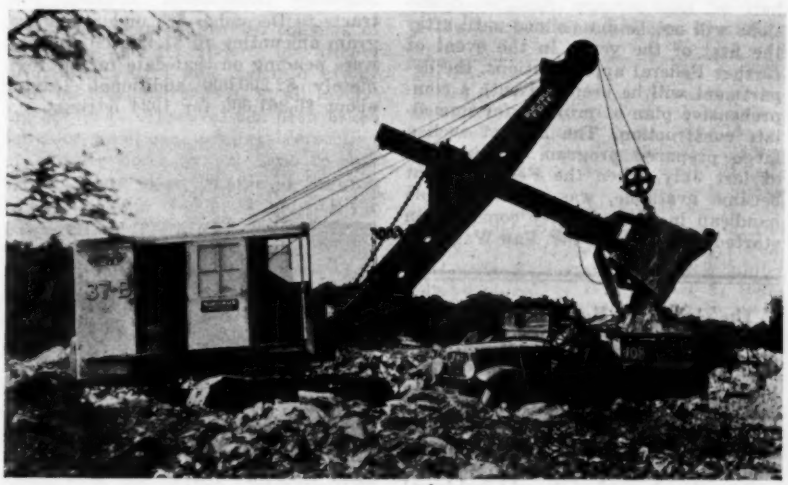
Michigan

Surfacing completed by the State Highway Department in Michigan during 1933, totals 309 miles, 158 miles of which is 20-foot concrete paving, it is revealed by a survey of the year's work.

The following types of work make up the 1933 surfacing program:

	Miles
20-foot concrete pavement	158
Concrete pavement widening	27
Gravel surfacing	62
Asphalt on gravel	18
Asphalt on concrete	1
Bituminous retread	6
Gravel surfacing	16
Stamp sand resurfacing	21

It is estimated that at least 50 per cent of 1934 construction will consist of high grade paving and not less than 35 per cent, of grading, drainage and gravel surfacing. No figures are available at this time as to the amount of



Tough going was made easy on this Texas highway job by a Bucyrus-Erie 1¼-yard gas shovel owned by W. W. Van & Company of Mercedes. International trucks haul the rock and earth away.

excavating that may be required in this work.

During the first half of 1934, Commissioner Murray D. Van Wagoner expects to expend practically all of the unexpended balance of the $12,736,000 Federal Public Works highway grant made available to Michigan in 1933. While originally announced as a two year program, the department placed under contract, during the first six months, approximately $7,000,000 worth of projects to be financed from this grant.

The remainder is expected to be under contract during the first few weeks of 1934. Additional construction of highways in Michigan will depend very largely upon the actions taken by the National Congress and by the State Legislature, if the latter is called in a second extraordinary session, the Commissioner states. This is due to the fact that no large amount of State funds will be available for construction, under the existing set-up.

The department will carry over to 1934 approximately $4,500,000 of unearned contracts covering various types of highways. This, added to the contracts to be let during the early part of the year, will make up a total of about $10,000,000 to be actually expended from the Federal grant during the first six months of 1934.

During the same period the Highway Department expects to carry on the supervision of several hundred CWA highway betterment projects. The department recommended more than 1,000 such projects in all 83 counties of the State within a week after the organization of CWA. At present more than half of these projects have been approved by the CWA administration, and in excess of 25,000 men were at work upon them. Other approvals are expected to follow. It is believed that the greater number of these projects will be completed during the first half of 1934.

It is impossible to make any forecast of construction work during the latter half of 1934 because financial conditions will not be determined until after the first of the year. In the event of further Federal appropriations, the department will be prepared with a comprehensive plan of projects for immediate construction. The lack of such a large prepared program on the first of last July, when the Federal grant became available, was a considerable handicap in getting early construction started, according to Mr. Van Wagoner.

The American Road Builders' Association states: "At present, while there are more than 3,000,000 miles of public highways in existence in the United States, only 150,000 miles have been paved. There are still 90,000 miles of trunk highways which have never been improved and a total of more than 2,000,000 miles of the rural system are still in the class of plain, old-fashioned 'mud' roads."

Part of Minnesota's 1933 Highway program included this new road near South St. Paul built by W. W. Magee and one of his fleet of five new Bucyrus-Eries. An International truck is "on the spot."

Minnesota

About $4,550,000 is at present in sight for construction of Minnesota highways during 1934. This is a decrease of about 35 per cent from 1933. $50,000 of this sum comes from Federal Aid, $3,500,000 from the NRA and $1,000,000 from State funds. Present plans according to O. L. Kipp, Construction Engineer, indicate that about $450,000 will go for grading 30 miles of new roads involving some 900,000 cubic yards of excavation and $210,000 for 30 miles of grading for construction and widening requiring 300,000 yards of excavation. There will also be some $400,000 for 175 miles of gravel or crushed stone surfacing, $450,000 for 120 miles of bituminous treatment, $670,000 for 12 miles of high grade paving, $450,000 for 37 miles of low grade paving, and about $1,620,000 for 30 bridges. Carried over on old contracts is some 3,500,000 yards of excavation to cost about $1,400,000

Mississippi

According to G. A. Draper, Chief Engineer, Mississippi has no funds in sight except for the present recovery program, which will have a total of approximately $10,000,000. The State Highway Department awarded contracts to December 7th under this program amounting to $1,439,000 and bids were pending on that date for approximately $2,200,000 additional, leaving about $6,361,000 for 1934 lettings.

Missouri

Chief Engineer T. H. Cutler regrets that uncertainty of funds prevents furnishing any data regarding Missouri's highway program for 1934. He hopes to be able to give our readers a definite forecast early in 1934.

Missouri, up to December 16th, was committed on contracts or advertised work for about half of her Federal allotment from the NRA programs. This involves 156 projects to cost $6,410,000 including the State's own funds and has given employment to over 4,600 men. About $6,000,000 of Federal funds will be available for 1934 highway construction in addition to work carried over into 1934 on 1933 lettings. There will also probably be some State money available although the amount cannot be estimated at this time.

Montana

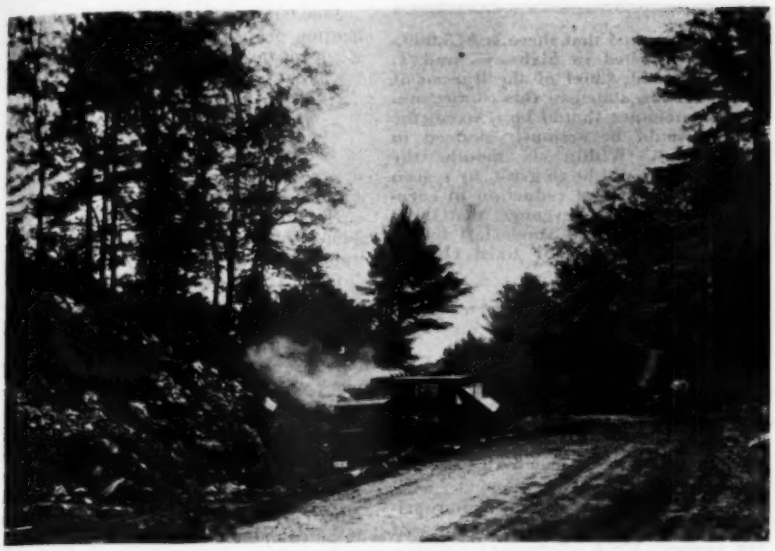
Public Works Projects: State Highway Engineer R. D. Rader advises that the Montana Highway Commission has secured the approval of the Public Works Administration for a State highway oiling project, by which approximately 750 miles of gravelled highway will be oiled by the road mix process. $1,250,000 in State gasoline tax debentures will be purchased by the Public Works Administration and will be used as the State's share of this project. A 30% grant on labor and materials will be added from Federal funds.

State Debentures: In addition, $1,500,000 worth of gasoline tax anticipation debentures will be available for sale on and after January 1, 1934. The sale of these debentures will depend, of course, upon the condition of the bond market, or upon possible purchase by the Federal Government. If they can be sold, the funds will be used for State highway betterment and construction.

Federal Aid: Montana's 1934 construction program will depend very largely upon any appropriations made by Congress for Federal Aid or relief highway construction. This, of course, cannot be determined until after Congress acts upon the matter.

The Montana Highway Commission receives all net proceeds of the 5-cent

John Govercki rolling out 4000 yards per 10-hour day on a county road near Clarkfield, Minnesota, with a Caterpillar Diesel Seventy-Five and a Caterpillar "48" power controlled elevating grader. Fuel, 3.1 gallons per hour—8 cents per gallon delivered.



Lane Construction Company are the contractors, a beautiful New Hampshire State Highway is the place and the Bucyrus-Erie 1¼-Diesel keeps everything on schedule.

State gasoline tax. This present revenue is, however, taken up almost entirely with the costs of administration, engineering, maintenance and the purchase of right-of-way.

Montana had let or advertised on December 16th, 78 projects obligating $4,700,000 of her PWA allotment or 63.2 per cent. There will, therefore, be close to $3,500,000 of the present Federal NRA funds available for 1934 lettings.

Nebraska

The construction program for the year 1934 is only in a tentative stage and it is not possible at this time to give any accurate figures pertaining thereto. However, it is estimated that there will be available for construction work during that year approximately $2,600,000 of State funds.

By the end of 1933 the Department of Roads and Irrigation will have obligated approximately 77 per cent of Nebraska's allotment of National Recovery Highway Funds amounting to $7,828,961. E. J. Babcock, Jr., of the Division of Maps and Plans, advises that inasmuch as the greater part of this work was obligated late in the construction season a large part of actual construction work will be carried over into 1934.

Nevada

The NRA program as outlined by the Nevada Department of Highways and approved by the Bureau of Public Roads, allotted $2,909,386 for construction on the Federal Aid System, outside municipalities, designated as NRH projects; $5,000,050 for construction within municipalities, designated as NRM projects; and $1,136,479 for construction on secondary or feeder roads designated as NRS projects. The total allotted to Nevada under the above appropriation was $4,545,917.

In addition to the above. there was allotted to Nevada for construction through Public Lands, designated as NRPL projects, the amount of $1,129,958.

Of the NRH funds there had been programed to December 5th, 20 projects on 241.72 miles totaling $2,173,560. Four called for plant-mix asphalt, two for concrete, eleven for oil-mix gravel, two for gravel and one for grading and graveling. Four additional NRH projects have been submitted by S. C. Durkee, State Highway Engineer, to Washington for approval. These consist of 5 miles from Dry Lake to Crystal including underpass, estimated at $70,000; 5 miles from Lovelock east to cost $30,000; 20 miles from Kirkhead to Mina to cost $160,000 and a small bridge near Mesquite for $1,000.

There are programed six NRM projects, all concrete in Elko, Carson City, Reno, and Sparks. These are estimated at $485,000.

NRS projects programed consists of ten grade and gravel jobs, one timber bridge, one steel and concrete bridge and the Moapa overpass, in all involving $927,000. Approval has been asked for four additional projects consisting of 6 miles northeast of Reno to cost $30,000, road oiling a mile at Stewart Indian School $3,000, Muddy River Bridge including approaches $35,000, and highway from Junction with Route 4 to Preston in White Pine County costing $35,000.

New Hampshire

The Highway Department will have let previous to 1934 only $100,000 of their NRA allotment of $1,909,839. It is impossible to say what additional revenues will be available besides this balance of $1,909,839. Carried over from 1933 is about 275,000 yards of excavation to cost $110,000.

New Jersey

The amount allotted to the State of New Jersey from NRA funds was $6,346,039. That sum is included along with available State funds, in the making up of the program of construction totaling $8,838,000.

Projects still to be advertised under this program include: $407,000 for the CRR underpass on Spring St. in Elizabeth; $925,000 plus $350,000 for bridges on 11.6 miles of Route 23 from Signac to Smith Mills; $350,000 plus $65,000 bridges on 2.4 miles of 10 from Succasunna to Ledgerwood; $250,000 plus $110,000 bridges on 4.2 miles of 10 from Route 5 toward Dover; $25,000 for underdrains on 26, Trenton to New Brunswick; $200,000 for 3 miles of 25 from Union School House Road to Moorestown Road; $300,000 for 4 miles of 25 from New Brunswick toward Hightstown; $20,000 plus $80,000 bridge work on the D. L. & W. overpass at Port Colden on 24; $40,000 on 0.8 mile of the Ocean City-Somers Point Highway; $10,000 for the Port Elizabeth Causeway on 49; $50,000 for the Shabakunk and Little Shabakunk Creek bridges on 27; $55,000 for Union Branch Bridge and pavement at Lakehurst on 37 and 40; $205,000 plus $55,000 for bridge to cover the Pennington By-pass on 30; $400,000 for the Big and Little Timber Creek bridges on 47; $50,000 for the N. Y. S. & W. overpass on 31 at Hamburg.

In addition to the above the State Highway Commission has recommended to the Governor in accordance with the provisions of statute a State highway construction program for the year 1934 totaling $13,711,389 together with additional projects for substitution totaling $7,951,000. These programs will be passed on to the Legislature with the Governor's recommendations and will be disposed of as the Legislature sees fit. The primary state program covers construction of 101.2 miles and includes $6,441,800 for right of way; $2,082,000 for bridges, viaducts and railroad grade separations; and $4,516,000 for highway construction. Included in the last two classifications are: $75,-

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Recent reports show a marked increase in the number of construction contracts resulting from PWA loans and grants. Latest compilations show that contracts made and work already under way on Federal projects alone involve expenditures amounting to well over $700,000,000. In addition, on December 9, $143,407,873 worth of Federal PWA project contracts were under advertisement to be awarded in from 1 to 30 days. Daily more such contracts are advertised and daily more awarded.

At the same time bond purchase contracts and grant agreements have been sent by PWA to over 650 non-Federal applicants, including corporations eligible for loans under the National Recovery Act. Over $600,000,000 has been allotted to non-Federal projects found qualified.

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000 for bridges and $950,000 for road work on route 2 Ridgewood to Ramsey; $150,000 for the removal of the old bridge at Secaucus on 3; $200,000 to complete grading on S4-A; $75,000,000 for bridges and $165,000 for road construction on 6 and 23 at Singac Circle and R. R. crossings; $790,000 for bridges and $660,000 for highway on route 6 Hasbrouck Heights to Paterson; $75,000 for removal of the old bridge at Little Ferry on route 6, $75,000 for bridges and $725,000 for road construction on route 10 Dover to Succasunna; $220,000 for construction on 21 Lafayette Street to River Street; $60,000 for bridge and $300,000 for road construction on 21 on River Street to Clay Street; $50,000 for bridges and $350,000 for road construction on 25 from Five Points to Bridgeboro; $150,000 for viaduct and $350,000 for road construction on route 25 for the Hightstown By-pass; $100,000 for the C. R. R. bridge at Hampton on 30; $7,000 for the W. Br. Shabakunk Creek bridge on 30; $140,000 for By-pass and $210,000 for road construction on the Somerville By-pass on 31; $50,000 on 35 for the Belmar widening; $25,000 for widening 36 Union Beach to Keansburg; $53,000 for Causeways on 32; $125,000 for the Mantua Creek bridge on 44; $40,000 for bridges and $200,000 for road construction on S49 for Green Creek to Dias Creek and Causeways; $175,000 for the Cohansey Creek bridge on 49; $58,000 for the North Avenue connection between route 24 and route 27.

New Mexico

The State Highway Department expects to have available for construction in 1934 approximately $4,025,000 which is about the same as the 1933 allotment. The entire sum comes from NRA funds with $940,000 for NRH projects, $1,000,000 for NRM, $1,000,000 for NRS, $900,000 for NRWR, and $185,000 for NRFLP.

Roughly the New Mexico program will consist of 45.6 miles of grading to cost $382,000 and involving some 25,000 cubic yards of excavation; 475 miles of grading and gravel surfacing to cost about $900,000 and involving 250,000 yards of excavation; 516 miles of NRS grading, draining and surfacing estimated at $1,000,000 and requiring 500,000 yards of excavation; oil treatment on 175 miles to cost $715,000; also 10 municipal jobs of oil treatment on 15 miles including grading, draining, base course and oiling to cost some $216,000 and involving 25,000 yards excavation; 0.3 miles of high type paving to cost $35,000 and requiring 5,000 yards excavation; 7.8 miles of pavement widening on 10 small municipal jobs to cost $189,000 and requiring 50,000 yards excavation; 9 bridge and grade separation jobs costing $528,000 and calling for 50,000 yards of excavating.

In addition to the above there is carried over from 1933 about 200,000 yards of excavation to cost $45,000.

It is estimated that there is $15,000,000,000 invested in highways, and T. H. MacDonald, Chief of the Bureau of Public Roads, stated in this connection, "If maintenance should be relaxed, the effects would be seriously noticed in thirty days. Within six months the money loss would be so great, by reason of depreciation and reduction in earnings from gas tax revenues, that there would be insufficient funds left to the states and counties for fixed charges and maintenance alone."

New York

The State Legislature does not convene until January 2nd after which time they appropriate funds for highway construction and maintenance. These funds are usually not forthcoming until some time in March at which time the state work is planned.

In addition to State funds appropriated there is only a small balance of the present PWA allotment available. To December 16th New York had 94.2 percent of her NRA funds contracted or advertised. This involves 218 projects to cost $22,078,000 of which $21,030,000 was from Federal funds. Considering the size of the program New York led all states in getting her NRA highway program underway and had provided employment for 7,645 men to December 16th. Because of late lettings a large percentage of this work will be carried out in 1934, however.

North Carolina

The total amount of funds available to North Carolina's State Highway and Public Works Commission for 1934 is expected to be $6,785,000. According to John D. Waldrop, State Highway Engineer, this is an increase of approximately 100 per cent over funds available for 1933.

This amount will be made up: from Federal Aid, 5 per cent; Emergency Federal Relief, 94 per cent; State appropriations, 1 per cent.

About 780 miles of highway are included in the program for the coming year, and it is contemplated that in this mileage 386 miles will be new grading; 500 miles, oil treatment; 200 miles, low grade paving; and about 80 miles, concrete or asphalt paving.

$100,000 has been set up for beautification projects, and $2,000,000 for various projects within the cities and towns.

North Dakota

The amount of highway construction to be done in North Dakota in 1934 is dependent entirely on the Federal Funds available.

North Dakota's allotment of the $400,000,000 allotted for highways was approximately $6,000,000.

One half, or $3,000,000 is to be spent on the State Highway System; $1,500,000 in the cities and municipalities and $1,500,000 on feeder roads.

Approximately $3,000,000 worth of work will be under contract by January 1st, 1934, but only a small percentage of this will be done or even started until spring. So, in 1934 there will be about $5,500,000 worth of highway work completed or under contract in North Dakota, with a small proportion to be completed in the spring of 1935.

According to J. N. Roherty, Research Engineer, the $6,000,000 program is estimated to complete: 879 miles grading; 1036 miles gravel surfacing; 136 miles oil mix surfacing; 20 miles paving; and 6 grade separations and bridges.

Grading projects will average about 14,000 cubic yards per mile and the gravel surfacing requires 1,400 cubic yards per mile.

The oil mix surfacing will be almost exclusively plant mix and the oil gravel mats will be 20 ft. wide and 3 inches thick.

The paving will be split up into many small projects in the smaller towns. About six miles of the paving will be concrete and the balance will be bituminous. Most of the oil mix projects will have a portion of bituminous pavement (on black base) in connection with them and can be done with the same plant as the oil mix.

Two of the railroad grade separations will be of creosoted timber and the balance of concrete and steel.

A Scotchman was run over by a beer wagon and for the first time in his life the drinks were on him.

Allis-Chalmers Model "L" Tractors with Hercules-Insley scoops in cut and fill work on John Kess & Sons job near Edwardsville, Illinois.

Excellent progress was made on this Rhode Island road job by Arute Brothers with this 43-B shovel. Frank Arute was directing things from the running board of this Bucyrus-Erie 1½-yard gas shovel.

Ohio

The Department of Highways will have approximately $5,500,000 of the NRA project funds available for contract work after the first of the year. It is estimated that this sum will construct about 150 miles of highways including roadway, paving and drainage structures. The yardage involved in this work will be impossible to estimate at this date according to Earl V. Murray, Statistician.

Ohio contracts carried a provision that the contractor should proceed with such rough grading as is possible during the winter months, also to construct drainage structures during the present winter season.

No doubt there will be a percentage of uncompleted work carried over to 1934 on the contracts already placed under contract during the past fall and winter months, although the general report is that all contractors have made good progress in getting their work underway.

State funds cannot be estimated at this time.

Oklahoma

Chas. L. Wilson, State Highway Engineer, was unable to give a forecast of 1934 highway work for Oklahoma. However, Oklahoma, had obligated slightly less than half of her NRA allotment of highway funds and something like $4,500,000 remains for 1934 lettings.

Oregon

According to S. H. Probert, Office Engineer, Oregon will have about $6,200,000 for highway construction in 1934. This represents an increase of about 40 per cent over 1933. Federal Aid furnished $200,000, NRA $6,000,000 and in addition State appropriations of $750,000 will take care of right-of-way, surveys and contingencies.

The 1933-1934 program calls for 80 miles of grading on new roads to cost $1,400,000 and involving 2,800,000 yards of excavation. There will also be some 1,200,000 yards of excavation for grading on reconstruction and widening 30 miles to cost $650,000. Oregon expects to surface with gravel or crushed stone about 50 miles at a cost of $350,000. Oil treatment on 40 miles is estimated at $200,000. High type paving on 60 last June. On these strictly Public

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In reporting the status of the works program and outlook for the immediate future Federal Emergency Administrator of Public Works, Secretary Harold L. Ickes said:

"A little less than 6 months have elapsed since we embarked upon a $3,300,000,000 Emergency Program of Public Works authorized by Congress. It was necessary to set up almost overnight a functioning central and field organization for the proper consideration of projects and agencies to safeguard the taxpayers' money. This was done expeditiously.

"Much has been accomplished in the brief space of 6 months. Public Works dollars already have put a huge army of men to work. The total number of men thus re-employed by all agencies financed by PWA funds has passed the 5,000,000 mark.

"Another army of men now unemployed is assured of wages this coming year as the result of the allotment to ten thousand projects of almost all of the $3,300,000,000 voted by Congress miles will cost some $1,700,000; bitu- **Works construction projects, exclusive of Civil Works Administration and Civilian Conservation Corps projects, 750,540 men were employed by actual count on December 9. This figure is now approaching the million-man mark and will continue to mount for several months as a result of action already taken."**

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minous macadam on 125 miles will cost $800,000; bridges $1,100,000 for 60. It is estimated that approximately $4,900,000 of this program will be contracted in 1933, and $1,300,000 in 1934.

Much of the 1933 work is carried over into 1934 as contracts were let late.

It will be noticed that the entire construction program is planned to be financed from Federal funds. Due to reduced state revenues for highway purposes, state funds are available only for rights-of-way, surveys and contingencies.

Pennsylvania

Samuel Eckels, Chief Engineer, advises that the Departmen of Highways has at the present time approximately 1500 miles of low cost construction underway by Department forces, and this work will be completed during the winter and early summer.

This is in addition to the programs financed through the allocation made to Pennsylvania under the National Recovery Act.

The NRA Program of road work in Pennsylvania includes:

By Contract

146 miles contracted included letting of December 1.
41 miles advertised for bids.
40 miles pending approval in Washington.

227 miles to be built contract.

By Department Forces

666 miles approved.
31 miles to be approved.

697 miles to be built by Department Forces.

This makes a grand total of 924 miles on the NRA program.

To December 16th about three-fourths of the NRA funds had been committed on a total of 465 projects. There remains about $4,685,000 of the present allotment for 1934 lettings.

Rhode Island

According to G. H. Henderson, Chief Engineer, the State Board of Public Roads had available as appropriation for the construction, improvement and maintenance of State Roads and bridges for the fiscal year ending June 30, 1934, $2,684,000, of which $1,217,000 was appropriated for the construction and reconstruction of roads. Of this amount more than $700,000 will be spent by December 31, 1933, leaving $500,000 available in the year 1934. In addition to the above Rhode Island has, as a Federal grant, approximately $2,000,000 for highway construction projects to be carried out under the provisions of the Public Works Section of the National Industrial Act.

The construction and reconstruction program includes approximately 59 miles of new construction and 25 miles of reconstruction, which will involve in the neighborhood of 800,000 cubic yards of excavation.

(Continued on page 52)

The Travels of the PUBLIC WORKS DOLLAR

The Metropolitan Water District of Southern California presents an interesting study of the distribution of benefits from funds used in construction of the Colorado River Aqueduct.

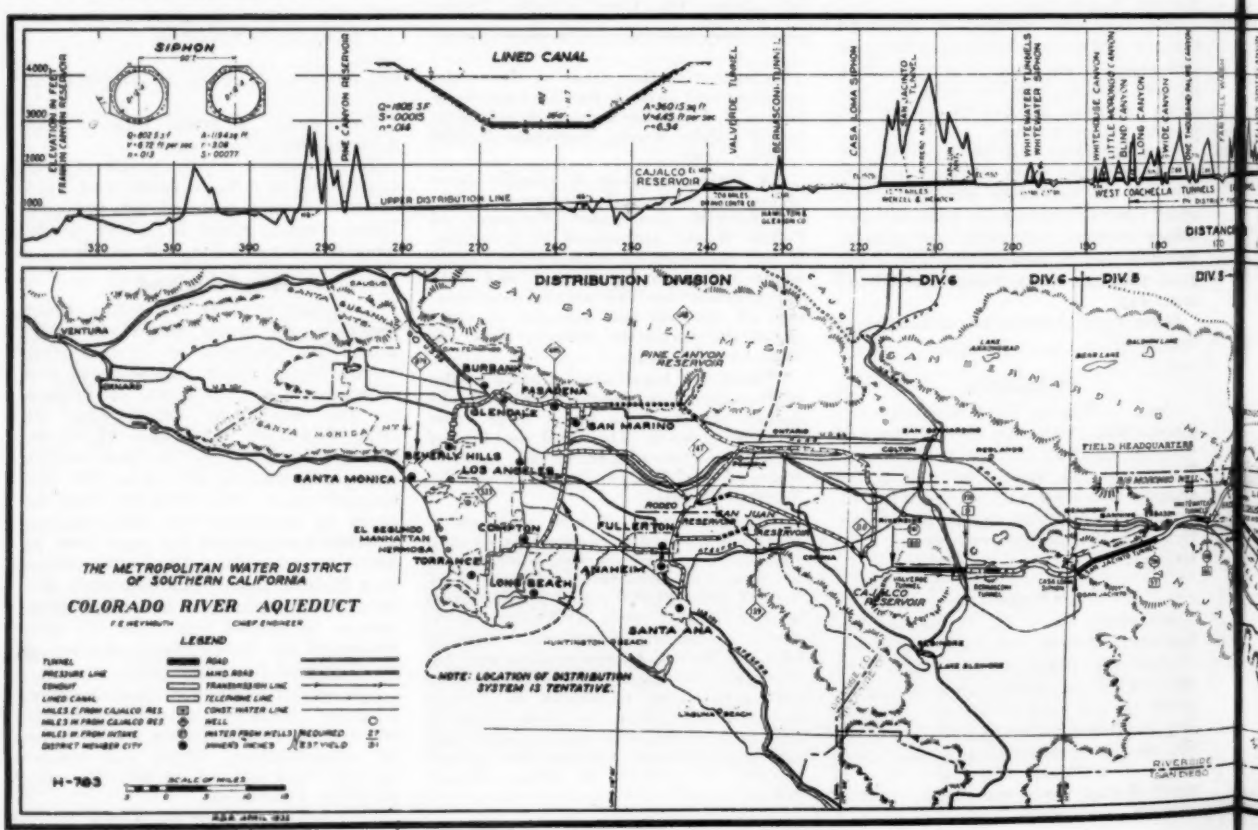
REPORT No. 602 of The Metropolitan Water District of Southern California shows graphically in charts and statistics the travels of the money that goes into the Colorado River Aqueduct. Particularly interesting at this time because of the government's use of public works to provide re-employment and combat the depression, this report as prepared by F. E. Weymouth, General Manager and Chief Engineer of the Metropolitan Water District, is summarized in the following pages.

The Colorado River Aqueduct, which is being constructed to bring Colorado River Water to the rapidly growing metropolitan

area of Southern California, is estimated to cost $209,420,000. This includes construction of the main aqueduct, distribution system, right-of-way, organization, preliminary engineering expense, and purchase of Pine Canyon Reservoir. It is estimated that $193,700,000 will be used for direct construction costs. Of this some $95,039,000 will be expended directly for labor and $77,260,000 for equipment, materials and supplies.

The division of costs is shown in the following table:

Items of cost	Outside California	Inside California	Total
Labor	$ 4,522,000	$ 90,517,000	$ 95,039,000
Equipment, material, and supplies	56,245,000	21,015,000	77,260,000
Other costs including contractors' profit and costs financing, bonds, insurance	18,566,000	2,835,000	21,401,000
Total direct construction cost	$79,333,000	$114,367,000	$193,700,000
Cost of right of way, Pine Canyon reservoir, etc...			15,720,000
			$209,420,000



How the nation benefits

Says Mr. Weymouth in his report:

"The entire United States has a large self-interest in this project because it is estimated that of the total expenditures for material alone, 73 percent, or $56,245,000, will go outside the State to agencies supplying finished products and raw materials for use in the manufacture of these products. This self-interest is increased when it is understood that of the total expenditures made directly for construction (including both labor and material), it is estimated that 41 per cent, or $79,333,000, will go outside of California. This interest is still further increased when it is understood that for each dollar paid to a California workman, 29 per cent goes directly outside the state. These distributions outside California when totalled equal $105,600,000 or 55 per cent of the total amount to be expended directly for construction."

Materials and supplies required

The following table from the report shows a classification of the materials and supplies required with a division of the expenditures showing that 72.8 percent of the $77,260,000 required for these items will be expended outside the state of California.

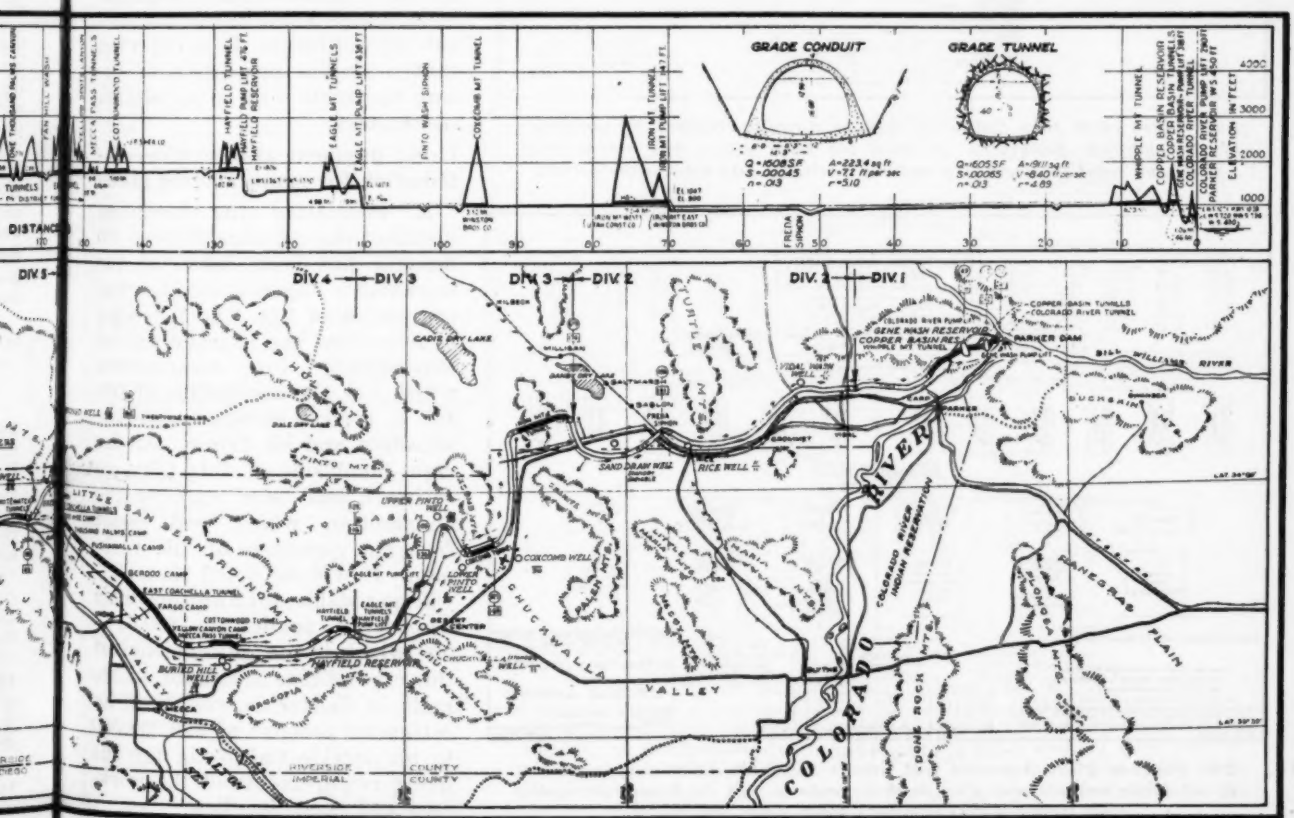
Construction materials	Total value	Distribution: Other states	Distribution: California
Construction equipment	$15,550,000	$13,800,000	$ 1,750,000
Steel products	14,770,000	10,593,000	4,177,000
Cement	9,700,000	2,800,000	6,900,000
Electric machinery	5,800,000	5,300,000	500,000
Explosives	4,900,000	3,380,000	1,520,000
Hydraulic machinery	4,050,000	3,990,000	60,000
Copper products	2,300,000	2,150,000	150,000
Lumber	1,090,000	990,000	100,000
Road oil	150,000	30,000	120,000
Miscellaneous small tools and supplies	3,620,000	2,600,000	1,020,000
SUBTOTAL	$61,930,000	$45,633,000	$16,297,000
Transportation (freight)	13,370,000	9,750,000	3,620,000
Total construction materials and equipment	$75,300,000	$55,383,000	$19,917,000
Percentages of total		73.5	26.5
Electric power (240,000,000 kw-hr.)	1,960,000	862,000	1,098,000
GRAND TOTAL	$77,260,000	$56,245,000	$21,015,000
Percentages of total		72.8	27.2

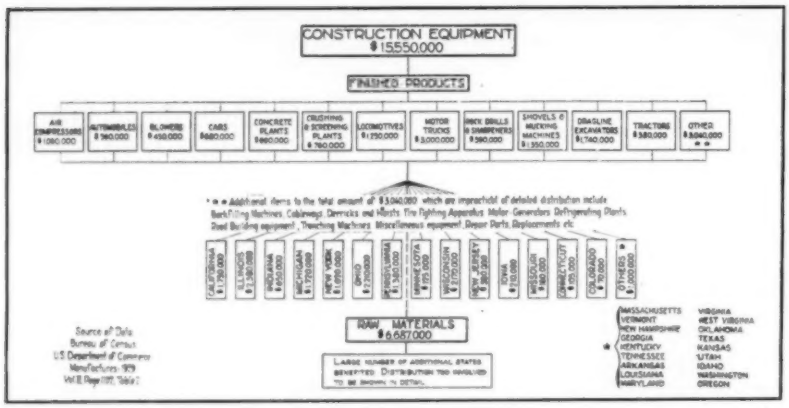
The accompanying charts indicate the distribution of expenditures under these various classifications to various states.

In addition to materials on which distribution is shown on the charts almost 5,000,000 cubic yards of concrete will be required. Estimated cost of the necessary cement is $9,700,000. This will no doubt be spent in four or five of the California mills. However, it is estimated that $2,800,000 of it will go on directly to other states. Machinery for plant renewals comes almost entirely from eastern plants; gypsum is mined in southern Nevada; packing materials come from Arkansas and North Carolina; and capital charges on the production of fuel and power will be paid to holders of securities in a large number of states other than California.

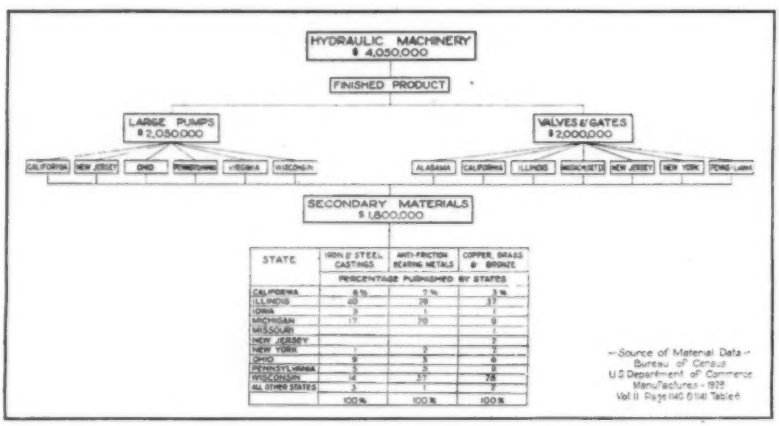
Distribution of lumber products has not been shown but will total $1,090,000 for timbers, poles and manufactured timber products. This will go largely to other western states, about $100,000 being estimated as California's portion.

Road oil valued at $150,000 will come largely from California, only about $30,000 being estimated as

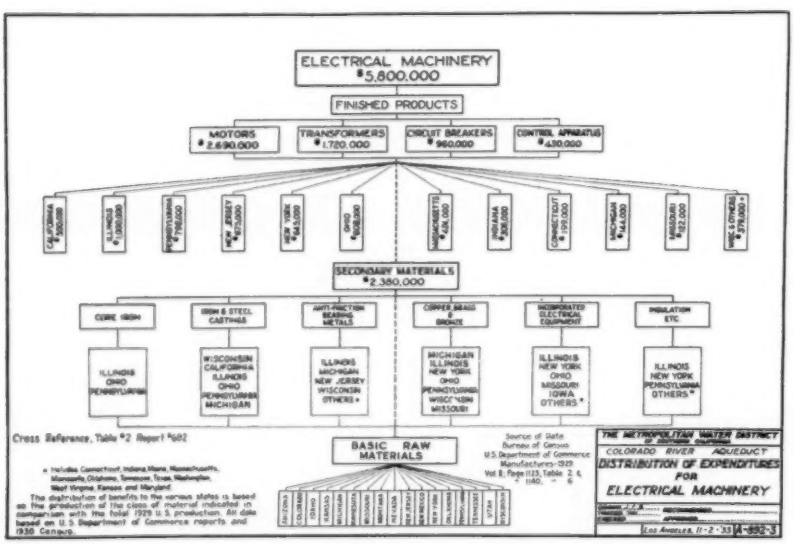




Graphically shown is the distribution of $15,550,000 for construction equipment. The figures shown represent the estimated amounts of money which will be spent throughout the construction period of about six years for equipment, replacements and parts. Only principal items have been shown.



Nine states other than California will be directly benefited by purchases of the hydraulic machinery. At least ten other states will benefit from $1,800,000 spent for secondary materials entering into their manufacture.


ELECTRICAL MACHINERY
$5,800,000
FINISHED PRODUCTS
MOTORS $2,690,000
TRANSFORMERS $1,720,000
CIRCUIT BREAKERS $960,000
CONTROL APPARATUS $430,000
CALIFORNIA $420,000
ILLINOIS $1,000,000
PENNSYLVANIA $960,000
NEW JERSEY $420,000
NEW YORK $640,000
OHIO $480,000
MASSACHUSETTS $280,000
INDIANA $280,000
CONNECTICUT $190,000
MICHIGAN $640,000
MISSOURI $120,000
MISC. & OTHERS $370,000
SECONDARY MATERIALS
$2,380,000
CORE IRON
IRON & STEEL CASTINGS
ANTI-FRICTION BEARING METALS
COPPER BRASS & BRONZE
INCORPORATED ELECTRICAL EQUIPMENT
INSULATION ETC.
ILLINOIS OHIO PENNSYLVANIA
WISCONSIN CALIFORNIA ILLINOIS OHIO PENNSYLVANIA MICHIGAN
ILLINOIS MICHIGAN NEW JERSEY WISCONSIN OTHERS *
MICHIGAN ILLINOIS NEW YORK OHIO PENNSYLVANIA WISCONSIN MISSOURI
ILLINOIS NEW YORK OHIO MISSOURI IOWA OTHERS *
ILLINOIS NEW YORK PENNSYLVANIA OTHERS *
BASIC RAW MATERIALS
Cross Reference, Table #2 Report #682
* Includes Connecticut, Indiana, Maine, Massachusetts, Minnesota, Oklahoma, Tennessee, Texas, Washington, West Virginia, Kansas and Maryland
The distribution of benefits to the various states is based on the production of the class of material indicated in comparison with the total 1929 U.S. production. All data based on U.S. Department of Commerce reports and 1930 Census
Source of Data
Bureau of Census
U.S. Department of Commerce
Manufactures-1929
Vol II, Page 1123, Table 2 & 1140, " 6
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
COLORADO RIVER AQUEDUCT
DISTRIBUTION OF EXPENDITURES FOR ELECTRICAL MACHINERY
Los Angeles, 11-2-33
A-852-3

The Colorado River Aqueduct will require $5,800,000 in electric machinery of all kinds and classes. The finished products will be drawn principally from twelve states, and many other states will benefit.

being spent outside the state.

Miscellaneous small tools and supplies totaling $3,620,000 will be required but because of the variety of relatively small items a breakdown of origin is very evolved. However, it is estimated that $2,600,000, will be spent for tools outside of California.

Transportation is a large item totaling $13,370,000 which will be widely distributed to all parts of the country. It is estimated that about 1,200,000 ton-miles of railway freight will be involved in transportation of finished goods alone. About 73% will be spread outside of California.

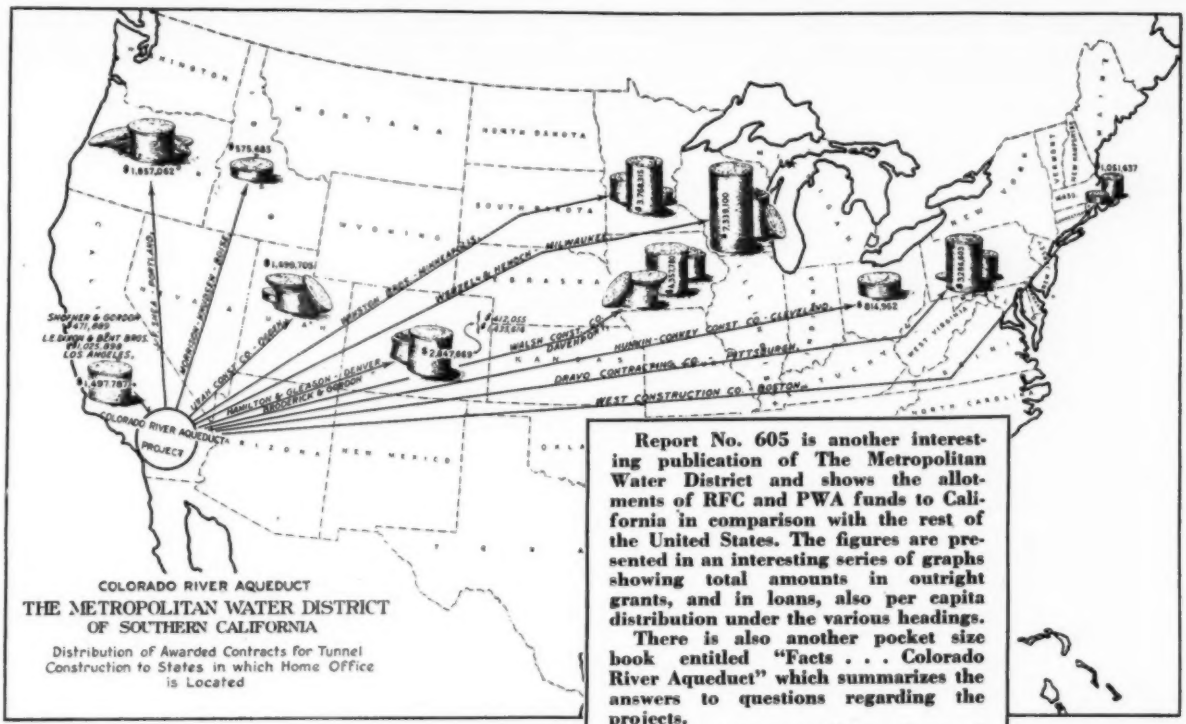
Contract awards

Contractor	Contract Amount	Home Office
Walsh Construction Co.	$4,357,780	Davenport, Iowa
Winston Bros. Co.	3,768,315	Minneapolis, Minn.
Utah Construction Co.	1,699 705	San Francisco & Ogden
Broderick and Gordon	1,435,614	Denver, Colorado
L. E. Dixon & Bent Bros. Co.	1,025,898	Los Angeles
Hunkin-Conkey Constr. Co.	814,952	Cleveland, Ohio
Gordon and Shofner	471,889	Los Angeles
J. F. Shea Co.	1,857,062	Portland, Ore.
Morrison-Knudsen Co.	575,685	Boise, Idaho
West Construction Co.	1,051,637	Boston, Mass.
Wenzel and Henoch	7,339,100	Milwaukee, Wis.
Hamilton & Gleason Co.	412,055	Denver, Colorado
Dravo Contracting Co.	3,286,603	Pittsburgh, Pa.

From the above it will be seen that 94.5 per cent of all contracts awarded for major aqueduct features to date have gone to firms whose home offices are outside of California. It is expected that a similar proportion of future contracts will go to outside contractors.

Labor payment also involves distribution for manufactured goods

In estimating the foregoing distributions of expenditures no account has been taken of the workman's expenditures for the necessities of life. The following figures show the average annual expenditure for commodities which are the necessities of life for a typical workman on the aqueduct and his family. At the right-hand side of this table an estimate has been made of the distribution which will result from the purchases of this workman. It will be noted that 29% will go outside of California. This percentage applied to $90,517,000 which is the total amount of the expenditure for labor to remain in California, results in an estimated amount of $26,250,000 to go outside California for the living requirements of the workmen and their families.



COLORADO RIVER AQUEDUCT
THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

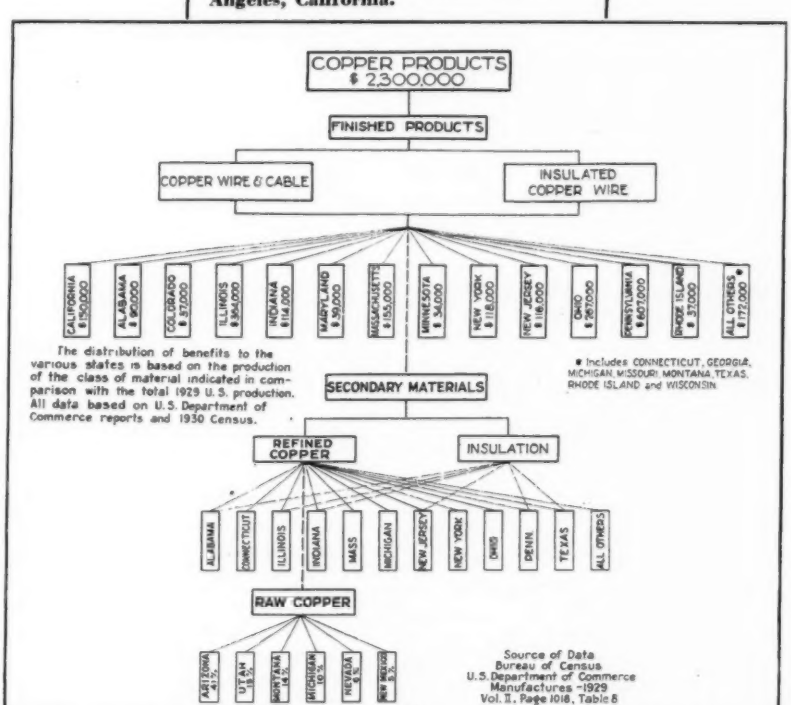
Distribution of Awarded Contracts for Tunnel Construction to States in which Home Office is Located

Report No. 605 is another interesting publication of The Metropolitan Water District and shows the allotments of RFC and PWA funds to California in comparison with the rest of the United States. The figures are presented in an interesting series of graphs showing total amounts in outright grants, and in loans, also per capita distribution under the various headings.

There is also another pocket size book entitled "Facts . . . Colorado River Aqueduct" which summarizes the answers to questions regarding the projects.

Copies of Report 602, a digest of which is presented here, 605 mentioned above, or the book of facts, will be forwarded on request by: The Metropolitan Water District of Southern California, 306 West Third Street, Los Angeles, California.

Items	Amount	California	Other States
Food:			
Meat, fish, etc.	$ 65	$ 65	$...
Dairy products	73	60	13
Cereals	10	3	7
Miscellaneous groceries	102	85	17
Vegetables	25	25	..
Fruits	6	4	2
	$281	$242	$ 39
Clothing:			
Hosiery	7	3	4
Underwear	17	8	9
Suits	20	4	16
Coats	18	7	11
Dresses	19	11	8
Shirts	4	2	2
Overalls	4	2	2
Gloves	3	2	1
Hats, caps, etc.	9	3	6
Shoes	23	1	22
	$124	$43	$81
Housing:			
Fuel and light:			
Gas	$27	$27	$..
Electricity	18	18	..
	$45	$45	$..
Furniture and furnishings:			
Household furniture	$73	$39	$34
Household furnishings	16	3	13
	$89	$42	$47
Transportation:			
Automobile	200	50	150
Gasoline and oil	62	62	..
Repairs, tires, etc.	65	50	15
Carfare	37	37	..
	$364	$199	$165
Medical care:			
Physician, dentist, oculist	50	50	..
Sundries:			
Barber Services	12	12	..
Confectionery	6	6	2
Drugs and toilet articles	14	7	7
Gifts and dues	34	25	9
Insurance	59	..	59
Reading material	22	11	11
Recreation	24	24	..
Telephone	18	9	9
Tobacco	24	..	24
	$213	$92	$121
Grand total	$1,557	$1,104	$453
Per cent	100%	71%	29%



Thirteen states will each provide from $34,000 to $607,000 worth of copper material in its finished state; secondary materials such as wire bars of refined copper, and materials for insulation will be drawn principally from eleven states and the basic raw copper from six states, Altogether, 21 separate states will derive the principal benefits.

Data for the preceding table was secured from reports—National Industrial Conference Board, 1914-30; U. S. Dept. of Labor; Monthly Review, August, 1932; California State Chamber of Commerce; U. S. Dept. of Commerce.

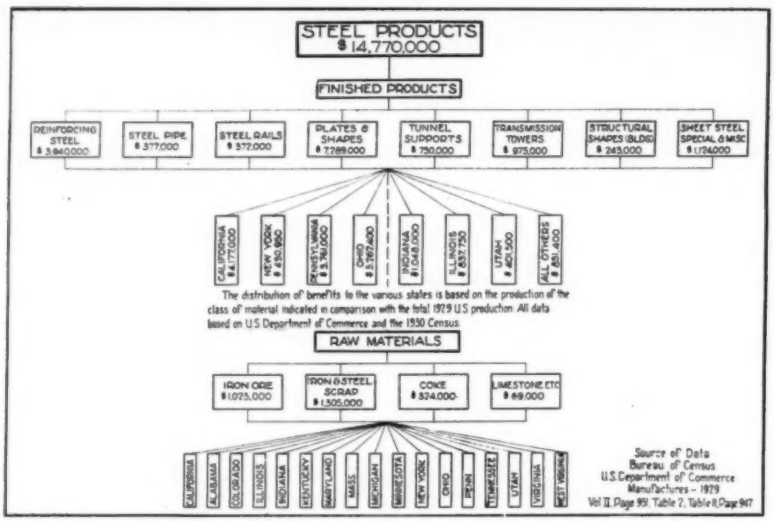
Summation of all benefits to other states than California

Direct purchases show a total of $79,330,000 to go outside California for material, insurance, bond premiums, contractors' profit, etc. If the foregoing expenditures of the workmen are added to this, it results in a figure of $105,583,000 (or 55% of the total direct cost of construction) for the total benefit to other states of the nation. Larger figures for the benefits to other states would be shown from successive analyses of the various exchanges or "turnovers" of the money paid out for aqueduct construction. Such further analysis is impracticable and has not been attempted. However, from the foregoing it may be said with confidence that Public Works Administration funds loaned to The Metropolitan Water District of Southern California for construction of the Colorado River Aqueduct will benefit the entire nation in a major way.

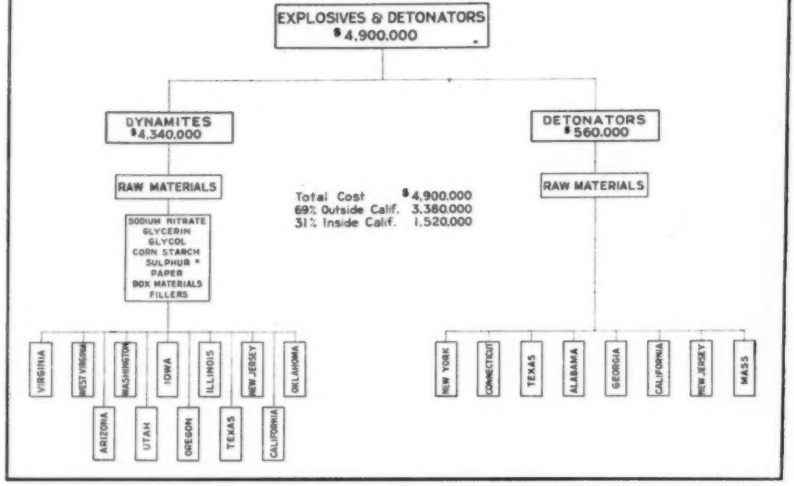
In conclusion Mr. Weymouth comments:

"When the District's application for $59,750,000 now pending before the Public Works Administration is approved, the District can have 16,000 men at work within four months after the money is made available.

"The PWA in its press release No. 223 states that for every man employed directly on construction, two are employed behind the lines producing materials and other commodities to serve the construction workmen. Most of these men would be employed fabricating materials for use in the work and providing commodities used personally by the workmen and their families. This means that 48,000 men will be given work as a result of the approval of such a loan of $59,750,000. This employment will benefit California and other states in the same ratio as their productions of the various items of material shown in the foregoing. For every PWA dollar spent on the Colorado River aqueduct, other states than California will receive at least 55 cents."



Here we see how the dollars spent for steel products, estimated to cost $14,770,000, will be distributed throughout the nation. A total of 264,000 tons are required; 104,000 tons of reinforcing; 7,250 tons of steel pipe from 1 to 8 inches; 8,850 tons of steel rails; 103,750 tons of plates and shapes; 10,000 tons for tunnel support; 15,000 tons for transmission towers, 4,150 tons for structural in buildings; 11,000 tons sheet and special steel for ventilating conduits and forms.



Here is what happens to the $4,900,000 to be spent for explosives.

Officers of the Board of Directors of The Metropolitan Water District of Southern California are: Chairman, W. P. Whitsett; Vice-Chairman, Franklin Thomas; Controller, D. W. Pontius; Secretary, S. H. Finley; Treasurer, Charles H. Toll.

F. E. Weymouth is General Manager and Chief Engineer, J. L. Burkholder is Assistant General Manager, Julian Hinds is Assistant Chief Engineer, James H. Howard, General Counsel, J. M. Luney is Assistant Controller.

The Metropolitan Water District headquarters is at 306 West Third Street, Los Angeles. Field Headquarters are at Banning, California.

Old Times & Old Timers

When the Boss Passed Cigars

OLD TIMER E. E. Childs is now an engineer at the Dixon High School, Dixon, Illinois. Back in the good old days, however, he used to be a shovel and crane fireman and operator and he sends us the picture below of an ancestor of the present Bucyrus-Eries that he fired for the Walsh Construction Company at Buda, Illinois in 1899. In telling about the job Mr. Childs says:

"It was some job to get Bill Kennedy, the runner, to give me a trial firing as I was just a greenhorn from a small place near there. This job was a 34 foot cut in a hill about half sand and the rest blue clay that dug hard. But we made some good loading records with this old Bucyrus anyway. I think 2,500 yards was about the best day's work in ten hours. The sand slid down twice and lifted the shovel off the rails. The dirt was loaded to dump cars

and went into a fill about a mile from there being hauled by two engines. The next day after we loaded 2,500 yards, P. T. Walsh treated the crew to cigars by the box. Mr. Walsh was a wonderful man to work for as he was like one of the boys and used to like to spend his evenings with them uptown. Jim McGrath was the foreman and a fine foreman he was too and when we did a big day's work he would reward us with a big smile that made us want to do it again. Both these men one never forgot.

"Jim Moss was the craner and, with Kennedy at the levers and Moss on the boom, it kept me hustling to keep her hot and to put rosin on the friction swing and adjust the drum as Bill wanted.

"When the Buda job was done we moved to Galena, Illinois and on the way down we stopped at Kewanee and had some rivets driven in bottom of mast. Outside of that the machine was perfect for those days and I consider it an honor to have been the first fireman on Walsh's first shovel."

Thank you, Mr. Childs. Some contrast between this old Bucyrus-Erie and the modern machines they make nowadays!

From a Seattle Old Timer

DAVE STALKER, an old timer who operated Bucyrus-Erie's No. 17 writes about the earlier No. 7 that graded for the Illinois Central back in 1899. Here is the way he tells it.

"The writer had occasion recently to call upon Old Timer Bill Defoe of the Clyde Equipment Co. who represents Bucyrus-Erie in this district. When leaving he handed me the February issue of Excavating Engineer.

"I was very much interested in the space given to Old Times and Old Timers, evidently created by that outstanding Old Timer of us all, N. C. McGinnis, to whom I most respectfully doff my hat.

"I enjoyed the article contributed by Tom McMenamin of Denver and as I am one of those who operated McArthur Bros. No. 17, I am passing the information along to Tom through your paper. I was on 17 in 1906 when it was on the Tidewater and Deepwater job at Oney Gap, West Virginia. I relieved Jim Cunningham who, I think, continued with the firm on their Cumberland job in Maryland. Bill Hurley joined me in Roanoke and went along as craneman.

"When Tom writes of '17' I feel as though he was referring to a grandchild of the McArthur Bros.' Bucyrus No. 7. This shovel was delivered to them on their contract on the Chicago Drainage Canal the century before the coming out of '17'. I first met up with '17' when it was on Illinois Central work—a grade reducing job between Atoka and Brighton in Tennessee. Bill Michels and Denny Kellegrew were already on the job in the spring of, I think, 1899, when Sam Cook took me along to crane for him on the shift opposite Michels. Those on the work during the time I was there were C. Hansen, Supt.; Frank McNeal, Assistant Supt.; Bill Donald, Gen- Foreman. Frank McNeal was transferred to another job and Henry Whitney moved in and was joined later by his brother, C. W., who was our night superintendent, John Fay was the blacksmith, and Jim Donald night foreman. Others on the job from time to time were Bill McAndrews, P. J. McNeff, Wm. B. (Skinny) Martin, George Jordon, Louis DeRussie as engineers; Case Sweet, Con Barlow and Lee Bigley as cranesmen. Some Old Timers I say!

" '7' was spoken as a 65 special Bucyrus, a forerunner of the firm's standard machine of this type. The A-frame and jack arms had to come off for transporting as the A-frame was too high for main line clearance. The jacks were made by bolting together two 14-inch I-beams with jack screws in either end and swung under the car back of the front trucks forming the base for carrying the A-frame when digging. This also was removed for shipping. The dipper, built for rock, carried a decided pitch which could not be adjusted as the back was a solid casting, the sticks fitting into the casting and bolted. The boom engines were the piston-valve type and the throttle the same. There was an intermediate gear between the engine shaft and the dipper shaft and sister sheaves at the point of boom consisting of one small and a large one. The craneman stood on the circle, the throttle being in such position he could not reach reach it sitting. Inside the house both hoisting and swinging drums set between the engines. The swinging drums were set high to allow the chains clearance over the hoisting drum on their way to the circle. A locomotive tender (which had the habit of jumping the track) and was used for coal and water, was also part of the equipment.

"With the finish of the Brighton job '7' went to the firm's shop at McCook, Illinois, where John Depew gave it as complete an overhaul as a shovel ever got. The year following '7' was on the Sherman Hill in Wyoming, but that is another story.

(Continued on Page 27)

FIELD NOTES

Taking the Short End on Odds 300 to 1

WHILE looking over a shovel recently we noticed that one of the driving tumbler take-up screws was missing. As a result whenever the machine was propelled the driving tumbler would twist, so that the propelling strain was all on one side of the driving lugs of the tumbler and on one side of the lugs on the caterpillar track links. As a result this tumbler was so badly worn that it had to be replaced and the complete tread belt was in very bad condition calling for replacement or a job of building up the driving lugs by welding.

When we asked the contractor why he had not replaced the take-up screw he replied that he had had one made by a nearby machine shop but when he got it he found that it did not fit. The reason he had not ordered one from the manufacturer was because the manufacturer's price was $3.00 for one screw while the local machine shop quoted him $2.00 thus permitting a paper saving of $1.00. However, when the machine shop take-up screw did not fit he continued working without the screw figuring that he would wait until the job was finished and then move the machine into town and to the machine shop where the job could be done more conveniently and a new screw made that would fit. The net result was that in trying to save $1.00 on the cost of this small part the contractor actually lost $300.00 which is the approximate cost of rebuilding the caterpillar unit.

"Excavating" Judicially Defined

IN A CASE decided by the Virginia Supreme Court of Appeals (98 S. E. 763) an excavating subcontractor's claim for extra compensation for blasting rock not expected to be encountered was upheld, although his attempt to take blasting wholly outside the term "excavating" was not successful.

A building contract called for excavation of a cellar to a depth of ten feet. Solid rock was struck just below two feet, unexpectedly to the general contractor, the subcontractor and the supervising engineer. The subcontractor refused to proceed unless assured extra pay for blasting. The engineer assured him that he would be so paid and the work was completed. However, the general contractor refused to settle on that basis and a lawsuit followed.

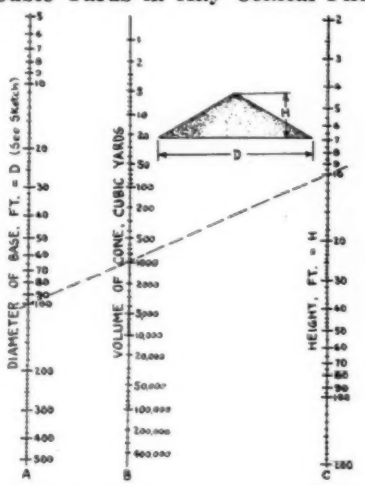
The subcontractor attempted to show that there was a local custom under which the term "excavating" was understood as referring only to earth and loose material. The court ruled that he fell short of proving such a custom binding upon the general contractor, but that the jury was warranted in finding in his favor on the ground that his claim was a bona fide one, and that the engineer acted within the scope of his authority when he promised extra pay. We quote the high spots of the opinion:

"Although the word 'excavate' be not a word of art requiring explanation from those skilled in a particular branch of trade or learning, even ordinary words or phrases may by usage of trade acquire a restricted or limited meaning, and, when they do, that meaning may be shown by parol [oral] evidence, and this is no violation of what is usually termed the parol evidence rule, but the custom is deemed to be a part of the contract. . . . Words, however, are generally construed in their usual, ordinary, and popular sense, unless it can be legitimately shown in some way that they were used in some other sense, and the burden of showing this is always upon the party alleging it. It would doubtless be a surprise to the public to learn that the word 'excavate,' as used in the case at bar, did not include solid rock, in the absence of any evidence of a local usage or a general trade usage such as is here claimed to exist. It was necessary, therefore, to establish such usage. The mere establishment of the usage, however, was not sufficient. It was also necessary to bring home to the defendant knowledge of such usage, or else to show that it was of such long continuance and so certain, general, universal, and notorious that knowledge thereof would be imputed to the defendant. A custom of trade cannot change the intrinsic character of the contract of parties who are ignorant of such custom. . . .

"While we are of the opinion, as hereinbefore stated, that the word 'excavate,' as used in the case at bar, covers the removal of solid rock as well as earth and loose material, yet as held in Stokes v. Amerman, 8 N. Y. Supp. 150, the contrary claim by Turner was not so clearly without foundation to support it as to create a suspicion of good faith in raising the question. As soon as he struck solid rock, he stopped work and notified the supervising architect that he would proceed no further unless he was paid extra therefor. The architect was the agent of the owner to see that the plans and specifications were carried out. There is some conflict in the evidence as to whether or not the architect agreed that he should be paid extra therefor, but if the architect had the right to decide whether or not he was entitled to extra compensation, the question was one for the jury, and there is sufficient evidence to support their finding."

—Arthur L. H. Street, Attorney at Law.

Cubic Yards in Any Conical Pile



WITHOUT any figuring whatever this chart quickly gives the number of cubic yards in any conical pile. For example, how many cubic yards in a conical pile whose base diameter is 100 feet and whose height is 10 feet?

The dotted line drawn across the chart shows how it is done. Run the line through the 100 feet diameter, column A, and the 10 feet height, column C, and the intersection with column B gives the answer as a little less than 1000 cubic yards.

The range of the chart takes care of all diameters from 5 to 500 feet and all heights from 2 to 200 feet. However, in the event that diameters or heights should be greater or less the same chart is still applicable. Thus if the diameter should be 1000 feet instead of 100 feet and if the height should be 100 feet instead of 10 feet, the same dotted line would solve the problem excepting that the answer would be 1,000,000 cubic yards instead of 1000 cubic yards. In that case the rule is this: For every cipher added to column A, add two ciphers to the answer in column B, and for every cipher added to column C, add one cipher to the answer in column B. This means that when the problem is 1000 feet diameter and 100 feet height, three ciphers must be added to the result in column B.

W. F. Schaphorst, M.E.

Steel Pavements Being Tested in Germany

ACCORDING TO ARTICLES appearing in the German press, for the first time in the history of German road construction, a section of a street in Duesseldorf was recently paved with steel. The steel grates or plates have a length of about 19½ feet, a width of 3¼ feet, and weigh 397 pounds each. They are delivered ready-made by the factory, thus facilitating the rapid laying of the sections. The foundation upon which these metal sections are laid is composed of basalt gravel. The sections are solidly anchored and fastened together either with bolts or by welding, and the depressions and grooves filled with macadamized tar to a depth which process insures a perfectly level surface which does not form waves and holes. The macadamized tar is reinforced with steel strips. It is not necessary to press the tar gravel into the grates, as this is done by the normal traffic.

The individual sections consist of zig-zag shaped, high-edged, grate-rods running crosswise of the road and resting on a longitudinal wide base to which they are welded or bolted. The gravel filling needs no retainer, as its purpose seems to be merely to fill the spaces in the grates and prevent the accumulation of dust, water, et cetera.

From observations made thus far, rubber tires do not suck out the filling, but after a time the ribs of the plates will protrude from 3 to 5 millimeters, and form the contact surface. The surface thus obtained is slightly corrugated which in combination with the zig-zag formed rods gives a good traction medium.

Among the advantages claimed for the steel pavement are durability, rapid construction, brief interruptions of traffic, thus obviating the necessity of detours. According to Professor Grunner, of Graz, 3¼ feet of road, 19½ feet wide, can be paved with steel grates in five minutes. It is estimated that a highway of a width of 59 feet would require about 800 long tons of steel per mile.

The costs as estimated by the Studiengesellschaft, under whose auspices the steel paving in Duesseldorf was carried out, are from 8 to 9 marks per square meter. The use of such paving on connecting streets and between great traffic centers may be considered, also in such regions as Northern and Eastern Germany where paving stones are not available, as the transportation costs of the steel grates in comparison with stone are comparatively small.

Steel grate paving is not an entirely new method. Many previous attempts have been made in other countries. In Austria a stretch of steel road is said to have been used over a long period of time and is well preserved. The subject has come to the fore at the present time on account of the serious unemployment situation and because of the many idle steel mills.

The writer of this report recalls that the steel company at Sault Sainte Marie, Ontario, Canada, some ten years ago laid a stretch of steel paving extending for a distance of about 200 yards, leading from its plant. When last seen in 1931, the steel plates appeared to be in a good state of preservation. While the plates were similar in size to the German steel grates, yet they were of an entirely different construction, being made of solid steel plates, about one-eighth of an inch in thickness. They were laid in two long strips covering the wheel tracks.

Small Pump Quickly Made

SMALL homemade pumps are an easy thing to make with plenty of tools to tinker and experiment with as it goes together, but the above photo shows an affair made in an emergency to get some fluid up through a cover cap opening. A short piece of pipe was found which would go some inches below the fluid level in the tank and still be long enough for a hand grip on it above the cap hole. A plunger or piston was cut from an old piece of belting leather so as to slide up and down easily in the pipe. Four fairly large nicks were then cut in it, and directly opposite each other on the improved piston. A piece of the soft sheet rubber from an old tire inner tube was then cut but slightly smaller than the inside of the pipe. The two pieces were then firmly and centrally tacked to the end of a fairly long stick, the rubber circle above the leather piece with the nicks in it. The rubber disc acted as an admission and check valve as the stick or piston rod was worked up and down. Two holes were cut in a short piece of the tube and it was placed over the mouth of the pipe, the upper hole being for the rod. This made a very satisfactory spout, as the back of the piece of tube was closed by tacking it down to two small sticks. This little makeshift easily raised quite a bit of the liquid, keeping a fairly steady flow from the odd but practical spout.

—Frank W. Bentley, Jr.

Old Timers

(Continued from Page 25)

"Old Timers in and around Seattle are: Ed Crane, Mike Finn, Jess Reese, Tom Singleton, Denny Kellegrew, A. O. Gordon, Gene and Albert Duffy, Jack Gordon, Bud Shiebley, Bill Rust and Mike Maloney."

Glad to hear from you, Old Timer Stalker, and greetings to the Seattle Old Timers.

EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

REGULAR SUBSCRIPTION: $1.00 a year; Canada, $2.00 per year. SPECIAL SUBSCRIPTION: Upon application on card inserted in this number, Excavating Engineer will be sent frequently (not regularly) free of charge. Only for those engaged in the industry of excavation.

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The Business Situation

"THE belief is rapidly growing that means must be found for stimulating the capital and durable goods industries. The Administration is giving study to this subject, although as yet there has been no indication as to how best to accomplish the end sought." This quotation is from a current publication of the Chamber of Commerce of the United States. The first part of the second sentence of this statement is mighty good news to those who have been watching and studying the course of business and the attempts of the Government to accelerate recovery in the past few months. At the present time almost one-half of the idle workers in this country are, in normal times, producers of durable or capital goods —goods which are not constantly consumed in daily life. It is quite natural that such a large percentage of the idle should be from these industries, because the purchasing of the daily necessities of life (such as food and clothing) decreases comparatively little during depression while the purchasing of durable goods drops off tremendously because people can do without them and get along with the equipment they have.

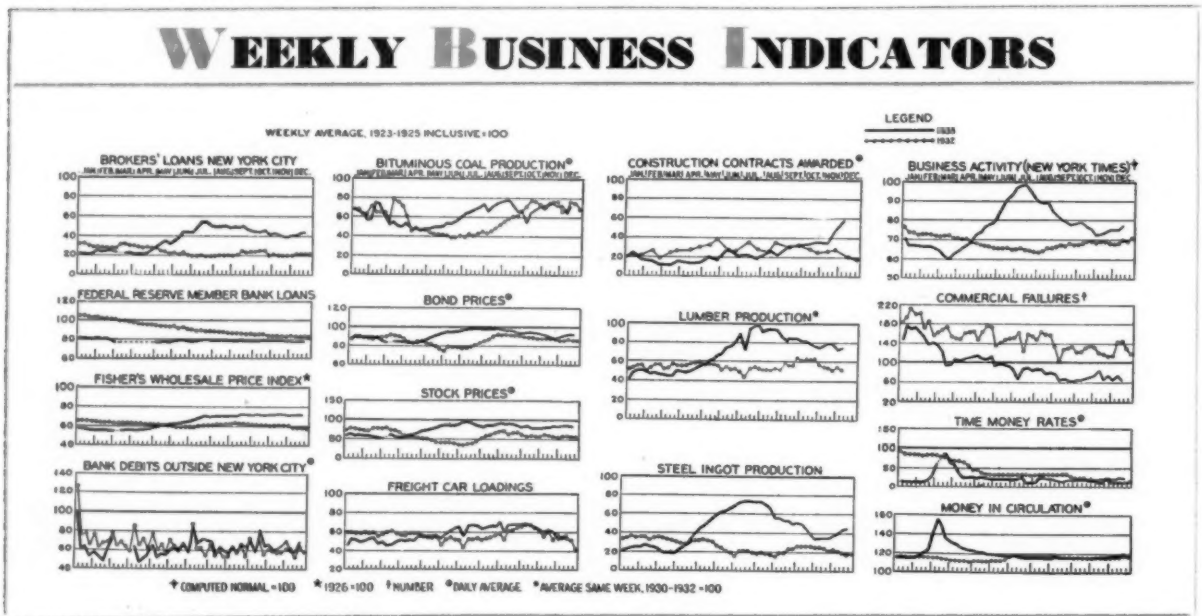
The majority of the other half of the unemployed workers is normally employed in service occupations such as railroads, retail stores, professional and personal services and so forth. And unemployment in this second group is caused largely because of the unemployment in the first group. Activity in the capital goods industries would automatically benefit the service industries and here is found the main handicap to recovery. So far, very little has been done to help the durable or capital goods industries. The National Industrial Recovery Act is of help mainly to the consumer industries and the $3,300,000,000 to be spent for public works over several years is, in reality, a drop in the bucket compared to the normal amount which would be spent in good times by private enterprise for construction of various sorts. Let us hope that every means will be employed to arrive at some sound plan for a normal stimulation of the capital and durable goods industries.

Contracts for construction projects of every description placed during the first half of December totaled $122,877,200 in the 37 eastern states according to figures of F. W. Dodge Corporation. This total for the half-month was more than 50 per cent larger than the total reported for the entire month of December, 1932. In addition the figures were more than 70 per cent ahead of the total reported during the first half of November, 1933.

Residential building contracts placed during the first half of December totaled $13,629,200 as against $12,957,500 for the entire month of December, 1932. For public works and utilities contracts were almost twice as large as the total reported during all of December last year, while for non-residential building the total of $25,423,100 for the first half of December compares with $24,-944,900 for the entire month of December, 1932.

The contract volume of $162,-330,600 reported for the 37 eastern states during November was almost 12 per cent larger than the total shown for October and almost 55 per cent ahead of the contract volume registered for November, 1932.

WEEKLY BUSINESS INDICATORS



Of the November construction total about $127,000,000 was for publicly - financed construction while the remainder represented privately-financed undertakings. The publicly-financed construction awards during November were almost seven times as large as the total for this class of work shown during April of this year when such work was at its lowest ebb. It is of interest, however, to note that though public work has been largely responsible for the recent increases in construction awards generally there has been measurable improvement also in privately-financed construction projects as contrasted with a year ago.

During November residential awards totaled $23,615,700 as against $21,525,700 in October and $19,245,300 in November, 1932. Non-residential building contracts placed during November amounted to $27,635,300 as against $31,117,400 in October and $31,844,800 in November of last year. Contracts placed for public works (civil engineering projects) amounted to $104,141,200 in November as contrasted with $85,729,000 in October and $50,095,900 in November, 1932; while awards for public utilities (also civil engineering) amounted to $6,938,400 in November as compared with $6,995,100 in October and $4,116,300 in November, 1932.

Total contracts of all descriptions awarded during the elapsed eleven months of 1933 amounted to $1,048,488,900 as against $1,269,939,400 in the corresponding period of 1932. It appears likely that for the full year 1933 the total will approximate $1,200,000,000 which, if realized, would mean a loss from the total of $1,351,000,000 for 1932 of only about 11 per cent though at midyear the loss was running at about 35 per cent.

Another item of decided encouragement is to be found in the November data on contemplated construction which totaled $939,131,100 as contrasted with $886,627,300 in October and only $114,349,000 in November, 1932. The current contemplated total is larger than that reported in any other month since April, 1930, and holds large promise for early translation into increased totals for contracts.

Let's Avoid Inflation!

INFLATION is not new. In China, over 2500 years ago, during the Chow dynasty, coins of heavier weight were put into circulation to prevent inflation—the rise of commodity prices—and the accompanying hardships. The nations of Europe have all experienced the anxiety and deprivation of inflation. Our own country went through it less than a hundred years ago.

Indeed, the memory of man must be short if he seriously considers voluntarily embarking on a program that has wiped out a greater volume of hard earned savings, has brought greater hardship to the peoples of the world than even the grim realities of business depression. Violent changes in the value of our medium of exchange, whether up or down, have always wrought havoc with our economic life.

We hear a lot these days about controlled inflation but we do not know enough about controlled inflation to make the term more than just a hollow sounding name. Inflation is self-propelling, it generates the fuel that accelerates its speed. The heroic measures finally necessary to stop it are much more difficult than the accession to the general public demand for cheaper money which feeds its flames.

Our memories are long enough to vividly picture the hardships of deflation. Let us take every step possible to avoid the similar difficulties of inflation.

Construction in the New National Budget

President Roosevelt's budget message to congress includes the following figures of particular interest to the excavating industry. The tabulation shows the estimated expenditures for the fiscal year ending June 30, 1934 as compared with the budget for the fiscal year ending June 30, 1935.

	Estimated for 1934 Fiscal Year	Budgeted for 1935 Fiscal Year
Public Works Administration	$ 9,812,000	$ 30,000,000
War Department (River Work Only)	131,934,000	75,552,000
Hoover Dam	5,450,000	24,000,000
Other Department of Interior Work	42,898,800	78,730,400
Public Highways	323,162,600	236,878,100
Civil Works Administration	400,000,000	
Tennessee Valley Authority	19,000,000	31,000,000
Loans and Grants to States	203,174,000	182,152,000

Address Wanted

MAIL addressed to Old Timer R. A. Walton, New Freeport, Pennsylvania is returned to us marked "unclaimed" by the Post Office Department. Can any of our readers give us Mr. Walton's present address?

Gus and Ole, at a northern fishing resort, hired a hotel boat and found great fishing at a certain spot in the nearby lake. So they decided to mark the place and come back for more sport after lunch. At the dock Gus said to Ole: "Ole, did you mark the place?"

"Yah," said Ole, "Ay put chalk mark on side of boat."

"Are you dumb!" exclaimed Gus. "Maybe ve don't get same boat after lunch!"

Motor taxes were created to pay for the roads and streets on which you drive your car—and for that purpose *ONLY*. Your mileage costs are LESS when you drive on improved highways. THIS PAYS YOUR MOTOR TAX as long as the road money is spent for improving the highways, the main city streets and country roads.

Now it is proposed to divert this money from job-giving road work to other purposes—to general public expenses which EVERYBODY should help to pay.

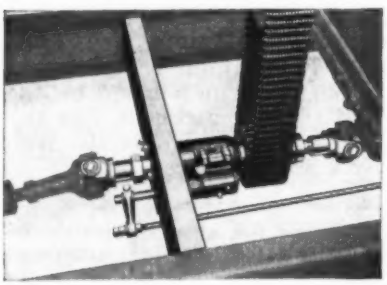
Motor taxes become CLASS taxes when they are used for other than the improvement of the motorists roadway. Misuse of highway funds will add thousands to the unemployed ranks. YOU will get less benefit for your motor taxes and so will the working man.

Let your Public Officials know you want ALL of the GAS TAX and LICENSE FEE MONEY spent for improving highways—AND NOTHING ELSE!

EQUIPMENT
You Ought to Know About

Ditwiler Power Takeoff

DITWILER *Manufacturing Company* of Galion, Ohio, have recently acquired what was formerly the Schultze Split-Shaft Power Takeoff for motor trucks. This takeoff has been improved and is now marketed by Ditwiler on a production basis. The device is installed by removing a section of the drive-shaft of the truck and by replacing it with a takeoff device which does not interfere with ordinary operation of the truck. Shifting a lever at the driver's seat makes the entire

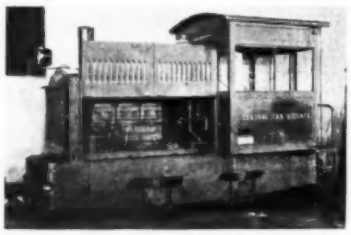


power and speed of the motor available for the takeoff. Two types are offered, No. 700 for direct power takeoff to be used with equipment mounted on truck, and No. 800 to deliver the power at either side of the truck by means of a shaft at right angles to the drive shaft. The Ditwiler takeoff is used to operate all types of portable construction, farm and industrial equipment such as air compressors, electric welders, water pumps, hammer mills, portable saws and so forth. A descriptive bulletin will be sent promptly upon request.

Improved Whitcomb Diesel Locomotive

THE *Whitcomb Locomotive Company* of Rochelle, Illinois, subsidiary of The Baldwin Locomotive Works, has recently shipped to Porto Rico an improved 12-ton Diesel locomotive with mechanical drive. The locomotive will start 390 trailing tons on the level with sanded rail or 290 tons with clean dry rail. It will haul 324 trailing tons up to 10.82 miles per hour and 190 tons up to 16.87 miles per hour and can be built for any track gauge from 30 inches up.

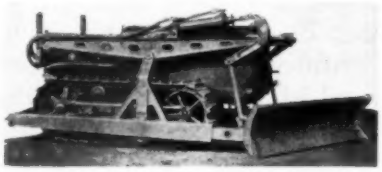
Power is furnished by a 6 cylinder, 4⅞-inch x 6-inch full Diesel engine, rated conservatively



by the locomotive builder at 85 net h.p. at 1200 r.p.m. Manufacturers claim that the machine will negotiate rough tracks without derailment. Special attention has been given to providing a clean cut design with a maximum of accessibility and convenience for the operating and maintenance. The Whitcomb line of Diesels ranges from 8 to 30 tons with mechanical drive and from 30 tons to 60 tons with electrical drive. Complete information can be obtained from the Whitcomb Locomotive Company, Rochelle, Illinois.

Trailbuilders by Continental

A COMPLETE line of Continental-Wooldridge Trailbuilders is offered by the *Continental Roll and Steel Foundry Company,* Industrial Equipment Division, of 332 South Michigan Avenue, Chicago, Illinois. Advantages claimed by the manufacturer including ability to power the blade down as well as up and to hold the blade where desired. Either point can be raised 16 inches above the opposite end or



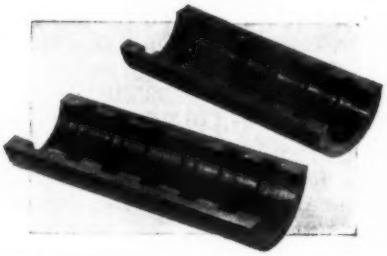
any intermediate angle can be obtained with the blade in a raised or lowered position. The blade can be angled to either side or operated as a straight-blade bulldozer. The blade is concaved so as to roll instead of push the material ahead of it. All controls and special adjusting mechanisms are convenient to the operator. The hydraulic pump and hydraulic jack are unusually responsive combining to assist the driver in maneuvering the blade and tractor for a big day's work.

Continental also builds a standard bulldozer which is powered hydraulically both up and down. It may be easily detached in a short time permitting the tractor to be used for other jobs. This bulldozer also has a curved, rolling blade for easier operation.

For Allis-Chalmers 35, Caterpillar 35, Cletrac 35 or McCormick-Deering 40, the Continental Wooldridge trailbuilder carries an 8 foot to 8 foot 6 inch blade 22 inches high. Extreme angle of blade is 25 degrees and it will cut 16 inches below normal ground level or lift 30 inches above it. The approximate shipping weight is 4200 to 4500 pounds.

Please mention *Excavating Engineer* when writing for information on new equipment.

Non-metallic Gatke Moulded Bearings

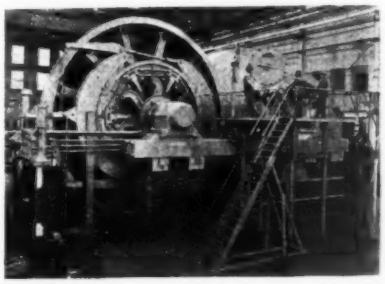


NOW available in a complete line for all machinery uses, the *Gatke Corporation* of 228 North LaSalle Street, Chicago, offers generally the Gatke bearings formerly made exclusively for steel mill service. They are composed of a special textile base impregnated with synthetic resins, moulded under high pressures.

They are offered in three basically different materials for various services: Gatke Hydrotex for bearings running in water or where water is available for lubrication; Gatke Lubritex for oil lubrication; Gatke Grafitex for self lubrication especially for slow moving machinery where dirt and grit are encountered or where lubrication is neglected. Gatke Corporation will gladly furnish complete information.

Nordberg Builds Giant Mine Hoists

NORDBERG *Manufacturing Company* of Milwaukee, Wisconsin, is at present building two large electrically driven mine hoists, one for ore and one for men and materials for the Home-



stake Mining Company of Lead, South Dakota. These giant hoists are classed among the largest of their kind in the world and are without question the largest in the Western hemisphere. They rank along with the largest steam hoist and the largest coal hoist, both Nordberg products.

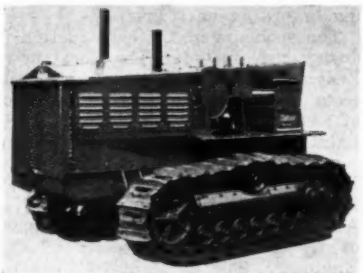
These new hoists are of unusual design, each having two drums mounted on parallel shafts and in tandem arrangement. These are practically duplicates except for the drive, the ore hoist having two direct current motors of 1,500 horsepower each, while the man hoist has but one of the same size. The conical drums are 12 feet in diameter at the small end and increased to 25 feet at the large end. The ore hoist winds 5,400 feet of 1⅞-inch rope and lifts a load of 14,000 pounds of rock per trip. The total rope pull is 57,000 pounds. The man hoist carries a load of 40,000 pounds using 1⅝-inch rope with capacity of 5,765 feet. The drums operate at a speed of 35 r.p.m. and each weighs 210,000 pounds. Each shaft is 40 feet 5 inches long, 30 inches in diameter, and weighs 77,000 pounds. 26 railroad cars are required for shipment.

The drive is through herringbone gears which are 12 feet in diameter with 30-inch face. Each drum carries a Nordberg brake 14 feet in diameter with 20-inch face. To permit hoisting and balancing from different levels, axial plate friction clutches are provided. Safety devices are also installed to shut off the power and set the brakes in case of overspeeding, overwinding, failure to stop the hoist when landing level is reached, to reverse the hoist when reaching the limit of travel, or through failure of current supply. Electrical equipment is by G. E. and in addition to motors and controls includes two motor generator sets.

Please mention *Excavating Engineer* when writing for information on new equipment.

Cletrac Diesel 80

THE *Cleveland Tractor Company* announces a Diesel crawler tractor in the 80 horsepower class which develops 85 hp in second gear. The Cletrac Diesel 80, except as to the engine, has the same specifications as the gasoline Cletrac 80. The manufacturers claim to have overcome the difficulty of heavy weight per horsepower of Diesel engines which has retarded their general use as power units for tractors. It is claimed that the Cletrac Diesel 80 is as easy to start as the



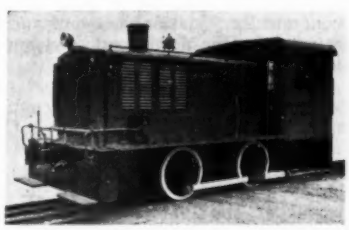
Cletrac 80 gasoline tractor due to installation as standard of electrical equipment of ample capacity. This also permits installation of lights at minimum expense. Bosch fuel distributing pump and fuel pump are used. Fuel delivery tubes lead from the pump to the nozzles on the left of the engine. Diesel power is also available on Cletrac's Blue Ox. Either machine develops 19,000 pounds pull at 1.7 miles per hour. A bulletin on either unit will be gladly forwarded on request.

New Storm King Signal Torch

FRANKLIN *Manufacturing Company* of Springfield, Ill., offer a new and improved signal torch called the "Storm King," attractively priced. It has a new "easy-on-and-off" cap that goes on like a radiator cap, won't leak and has no threads to clog with dirt. Flame and wick holder are of one piece preventing lost parts when filling. Stream line design enables it to burn through toughest weather and it is claimed to automatically eliminate carbon so that it gives a full sized flame to the last drop of kerosene. There is a self-righting weight on the bottom—a big handle which permits carrying six or more torches at a time. The Storm King is made of extra heavy steel and corrugated to increase the strength. Manufacturers guarantee this torch to burn through weather of cloudburst proportions. It holds three quarts of kerosene and burns up to 35 hours.

35-ton Vulcan Locomotive

THE illustration below shows one of two 35-ton, 224-hp gasoline locomotives recently built by the *Vulcan Iron Works* of Wilkes Barre, Pa., for the Pittsburg & Midway Coal Mining Company of Pittsburg, Kansas. This type of locomotive is also applicable to the industrial field and for cement plants, sand and gravel pits, quarries, and other types of mining service. The unit is powered with a LeRoi 8-cylinder, 224-hp gasoline engine. The locomotive has a starting drawbar pull of over 23,000 lbs. It has 4 speeds in either direction and is geared to 15 miles per hour in high. Driving wheels are 37 inches in diameter with a wheel base of 6 feet. Engine is equipped with Westinghouse straight and automatic airbrake, A. R. A. automatic couplers and spring draft rigging, bell and air whistle, and



is provided with I. C. C. safety features. The locomotive is equipped with special air-operated clutching arrangement.

For further information regarding similar locomotives, or locomotives of any type, write the Vulcan Iron Works at Wilkes Barre, Pennsylvania.

(Continued on Page 58)

SHOTS *from the Firing Line*

Low Bidders on First All-American Canal Letting

NEW BIDS on the All-American canal project were opened at Yuma, Arizona, on December 20th by the Bureau of Reclamation. The first bids were withdrawn. These new bids include work on the project from Pilot Knob through the Sand Hill district, about three times the amount of work originally advertised. Over twenty million yards of excavation work were included.

Low bidders were: on items 1 and 2 Henry J. Kaiser Co., John Phillips Co., and Bechtal Co. of San Francisco, bidding together at 10 cents on dirt with $1.00 for rock, $1,198,000 covering 7,140,000 yards dirt, 484,000 yards rock; items 3 and 4 Utah Construction Company, Morrison Knudsen Co., and Macdonald and Kahn Co. Ltd., of Ogden, Utah, bidding together at $778,668 or 10.41 cents on item 3 consisting of 7,480,000 yards and $793,063 or 11.89 cents on item 4 consisting of 6,670,000 yards.

As we go to press a wire report advises all bids were rejected and work is to be readvertised.

Nicholas Helmers to Head A. G. C.

NICHOLAS F. HELMERS, Vice-President in charge of construction for Siems-Helmers, Incorporated, of St. Paul, was nominated for President of the Associated General Contractors of America at a meeting of the governing board held November 14th at Washington. A. W. Merchant, head of A. W. Merchant, Incorporated, of Providence, Rhode Island, was nominated for Vice-President of the A. G. C.

The governing board adopted a resolution urging the Public Works Administration to take the lead in setting "an economically justifiable construction wage scale by downward revision of the present rates."

Protest was also made against public agencies doing suitable contract work by day labor. The Master Code for the Construction Industry and the seventeen supplementary codes filed under it which are all held up for approval of the labor board were discussed at length.

Highway Contractors Wait for Construction Industry Code

THE HIGHWAY contractors executive committee met in Washington December 12th, 13 and 14th where they gave approval to the Construction Industry and General Contracting Codes which are to form the base of the individual codes for the various branches of the construction industry. It was decided to do nothing further in attempting to set up the specific rules and regulations for the highway contractors until the basic construction codes have been finally drafted and have received the N.R.A. and Presidential approvals.

Members of the highway contractors executive committee who attended the meeting were: Louis E. Guyott, Chairman, The Guyott Construction Co., New Haven, Connecticut; J. M. Burrows, Des Moines Asphalt Paving Co., Des Moines, Iowa; L. B. McLeod, L. B. McLeod Construction Co., Williston, Florida, and Robert E. O'Connor, J. C. O'Connor & Sons, Fort Wayne, Indiana.

State Construction Industry Code

THE REDRAFT of the Construction Industry Code, as prepared by the committee appointed for the purpose of straightening out the existing difficulties, has been presented to the N.R.A. for approval. General Johnson expects to have all the remaining troubles ironed out and the code ready for signing before January first.

The sponsors of the construction industry code include: The Construction League, American Institute of Architects, Associated General Contractors of America, Int. Society of Master Painters and Decorators, Natl. Electrical Contractors Assn., Natl. Assn. of Marble Dealers, Heating, Piping and Air Conditioning Contractors Natl. Assn., Natl. Assn. of Master Plumbers of U. S., American Society of Civil Engineers, Tile & Mantel Contractors Assn. of America, Contracting Plasterers Int. Assn., Mason Contractors Assn. of U. S. and Canada, Roofing & Sheet Metal Industries Conf., American Road Builders' Association, Cement-Gun Contractors Assn., Natl. Building Granite Quarries Assn. and Natl. Elevator Manufacturing Industry.

Road Builders' Program

ONE OF THE OUTSTANDING events in the highway industry during the month of January will be the convention of the American Road Builders' Association at the Stevens Hotel at Chicago January 22nd, 23rd, 24th and 25th. The theme of the entire convention will be the continuation of an adequate highway program. Plans will be evolved to show through the presentation of facts and statistics that there is an economic need for a continued highway program, that the motor license revenues should be dedicated solely for highway purposes and that the interest and activities of the U. S. Government justify continuing large and adequate appropriations for road and street construction. Among the outstanding talks which will be presented during the two general open sessions on Monday and Wednesday will be "Summary of Federal Highway Progress," by T. H. MacDonald, Chief of Bureau of Public Roads; "Washington Observations of Interest to Road Builders," by Charles M. Babcock, Consumers' Advisory Council, N.R.A.; "The States and the Federal Government in Highway Development," by O. S. Warden, Chairman, State Highway Commission, Helena, Mont., and President American Assn. of State Highway Officials; "Tomorrow's Highway Needs," by E. B. Jeffries, Chairman, State Highway Commission, Raleigh, N. C.; "Roads Over Which the Mail is Carried," by W. G. Armstrong, President of the National Rural Letter Carriers Association, Niles, Mich.; and "The Highway Balance Sheet," by Roy W. Crum, Director of the Highway Research Board, Washington, D. C.

Proposed Central Valley Project Involves 38,311,000 Yards of Excavation

CALIFORNIA has applied to the PWA for $166,925,000 to be used by the State Water Project Authority to finance the Central Valley Project. Bonds were approved at the election December 19th. Work involves the following:

	Est. Cost	Excavation (cu. yd.)	Concrete (cu. yd.)	Steel (lb.)
Kennett dam and reservoir	$60,601,900	7,200,000	3,448,000	52,200,000
Kennett power plant	14,251,900	170,000	65,700	30,800,000
Keswick dam and reservoir	2,024,600	90,000	69,800	5,000,000
Keswick power plant	4,862,200	111,000	26,900	4,400,000
Kennett trans. line, etc.	13,621,800	20,000	30,200	26,840,000
Sacramento-San Joaquin Delta Cross channel	3,867,300	2,416,000	98,900	4,860,000
Contra Costa conduit	2,417,300	700,000	70,400	8,040,000
Friant dam and reservoir	13,646,800	433,000	1,328,000	3,000,000
Friant power plant	1,456,300	8,000	9,800	2,060,000
Madera canal	3,211,700	1,407,000	104,900	7,280,000
Friant-Kern canal	25,723,400	13,056,000	889,400	65,760,000
San Joaquin pump system	14,269,300	12,700,000	386,000	39,720,000
Totals		38,311,000	6,528,000	251,960,000

Steel includes reinforcing steel; structural steel; gates and hoists; rails; pipe and cranes. Does not include turbines and electrical equipment. Edward Hyatt, State Engineer, Public Works Building, Sacramento, is Engineer on this project.

Crushed Stone, Sand and Gravel and Slag Associations to Meet Week of January 22nd

THE National Crushed Stone Association, National Sand and Gravel Association, and National Slag Association will hold concurrent annual conventions at the Netherland-Plaza Hotel in Cincinnati, Ohio the week of January 22nd. The convention will be mainly devoted to discussion of code matters. The usual equipment exhibition will not be held in connection with the convention this year.

Fort Peck Project Started

By PAUL G. FRIGGENS

THE building of the Fort Peck dam near Glasgow, Montana, is actually underway. Six hundred men are at work clearing brush, and government appraisers are working in the valley above the dam site valuing farms and discussing moving with farmers who will be compelled to move. Glasgow is the railroad town from where a branch line will be constructed, and reports from there say there is a regular business boom. Business enterprises in that city have increased clerks from one to five. The government will spend millions on the project in the next few years. This is stimulating business in the whole northwest.

The greatest earth-fill dam in the world, the project will cost in all $72,400,000 to construct, when finished will reclaim an inland empire, provide power in almost unlimited amount, aid navigation and give employment to upwards of 10,000 persons while construction is in progress.

The dam will make a lake of the Missouri river extending back 180 miles. The lake will be 16 miles wide at its widest expanse, have a maximum depth of 200 feet, and will average from eight to ten miles in width throughout its length.

There will thus be stored an enormous quantity of water which is to be used for irrigation purposes, stabilizing the stream flow for navigation as far south as Kansas City; and generating power for central Montana use. The dam is also intended to curb floods.

The topography of the country through which the Missouri flows in central Montana lends itself ideally to the purpose. The creation of the lake will damage but little property while the use of the water in a scientific manner will permit the reclamation of millions of acres of lands that are now subject to regular losses either through drouth or floods.

The great dam when completed will be 231 feet high. The main dam will be 900 feet in length with an addition in the form of a dyke that will be 1,100 feet long. The completed dam will be 100 feet wide at the top and more than a half mile wide at the bottom.

Government engineers have been at work on plans the past year. The definite appropriation from the public works fund of $15,000,000 to start the project insures the beginning of the work. There will be months of preparation just to get ready for the actual construction. A railroad is to be built into the neighborhood of the dam and a model town is to be built to house and care for the thousands of workmen who will be required to complete the project. The town will be complete with schools, churches, hotels, movie theaters and garden plots.

During the progress of the work, the mighty Missouri will be diverted. Four big tunnels, each 28 feet in diameter and nearly a half mile long, will carry the stream until the dam is completed. These tunnels will be cement lined although there will be spots where the lining will be of steel. After the dam is built, the tunnels will be used to carry water from the created lake to the power house which is to be built at a point below the dam.

The Fort Peck dam will rank second to the Hoover dam in Colorado in size and cost. The lake it will create, however, will be 65 miles longer and will cover 57,000 more acres. The Hoover dam reservoir, though, will have a storage capacity of 30,500,000 acre feet of water to 17,000,000 for the Fort Peck dam.

As an aid to navigation the Montana dam will provide 30,000 second feet of water at Yankton, S. D., 35,000 feet at Kansas City and 40,000 feet at Herman, Mo. The army engineers have reported that this will give a dependable nine-foot navigation channel from Sioux City to the mouth of the Missouri river at St. Louis.

As compared with other great dams of modern times, the Fort Peck dam will rank as follows (all storage figures are for millions of gallons):

Fort Peck dam, 231 feet high, 5,547,589, $72,400,000. Gatun, Panama Canal, 105 feet, 1,373,520, $9,823,000. Osage, Lake of the Ozarks, 148 feet, 500,000, $30,000,000. San Gabriel, California, 435 feet, 78,204, $25,000,000. Keokuk, Iowa, 53 feet, $24,000,000. Conowingo, Maryland, 105 feet, 107,000, $52,000,000. Martin, Alabama, 160 feet, 448,370, $16,000,000. Ashokan, New York, 252 feet, 82,188, $30,500,000. Ayhee, Oregon, 405 feet, 232,938, $6,000,000. Arrowrock, Idaho, 349 feet, 91,238, $4,328,000. Roosevelt, Arizona, 280 feet, 533,515, $3,890,000. Coolidge, Arizona, 250 feet, 391,021, $5,500,000.

Short Courses in Public Works Construction

FOUR NEW short courses, giving training in construction methods in connection with public works projects, have recently been prepared by the Extension Division of the University of Wisconsin. The four types of construction work covered are highways, sewers, water supply systems, and plain concrete. These courses are taught by the correspondence-study methods for men resident in any part of the country. They are described as of benefit to assistant foremen and foremen, and as having special reference to the needs of men who will be engaged in national recovery projects. A working knowledge of arithmetic is required.

Foreign Notes

Colombia

According to a recent decree a commission has been appointed for the construction of a road from Cucuta, the Capital of Santander, north to Ocana, needed commercial outlet to the sea via the Magdalena River. The project will cost not less than 1,600,000 pesos (1 peso equals about $.607). The distance is roughly 120 miles and its construction will have an important bearing on the economical development of that part of Colombia.

Sicily

During the year public works projects amounted to approximately 204,000,000 lire were completed. These works (216 various projects) included practically all branches of public utility. The amount of road work totaled 40,913,682 lire, which has resulted in a very great improvement in both municipal and rural roads. Many of the public works were included in a special plan adopted by the Italian Government with a view of reducing unemployment.

Manchuria

In a list of 45 highways published by the Kirin Provincial Government Gazette, September 18th, 1933, there was a total of 120 miles of construction completed; 1,316 miles under construction; 600 miles surveyed. Previous reports indicated also, that 764 miles of highways were projected for construction in 1934. Practically all of the construction was awarded to Japanese firms, except in a few cases where work was done by the Provincial Highway Bureau.

China

The National Highways Board has announced the completion of 4,000 kilometers (2,485 miles) of new highways and plans an additional 3,000 kilometers (1,860 miles) during 1934.

Hawaii Notes

By PERRY H. KRAFT

The largest shore front construction project undertaken by the Navy since the World War, will get underway at once at Pearl Harbor Navy Yard. The contracts were let to the **Hawaiian Dredging Company** and call for an expenditure of $2,789,600 exclusive of cranes and other equipment. The new ship repair basin will be capable of berthing 7 large battleships at one time while major repairs can be made. The work includes construction of a central pier 100 feet wide and 1,144 feet long, two side quay walls 1,244 feet and 794 feet respectively and head quay walls, forming two slips 300 and 322 feet respectively.

The exceptional loads that have to be handled in connection with battleship repairs, necessitated an unusually heavy type of construction. The center pier will have a reinforced concrete

beam and girder deck, designed for 900 lbs. per square foot and supported on large precast concrete cylinders founded on wood piles and filled after placement with concrete. The quay walls are of precast concrete pile construction, with steel sheet piling to retain the earth behind the walls. Railroad tracks, crane tracks, oil, water and air supply lines and elaborate electrical service systems will be provided. Over 110,000 barrels of cement and 6,000 tons of reinforcing steel will be used in the concrete. Nearly 75 miles of wood piles and over 52 miles of reinforced concrete piles will go into the substructure. About 18 miles of electric conduit will be embedded in the decks.

Contract was let separately for four cranes which will be provided for the repair basin. Three will have a capacity of 15 long tons at 85 feet reach, and the fourth, which will operate on special tracks on the quay wall and pier, will have a capacity of 50 tons at 90 feet reach. This contract was awarded to the **Star Iron and Steel Company** of Tacoma, Washington at $257,480. It is also planned to re-erect a stationary crane on the west quay wall on special foundations being provided under the general contract. This will have a capacity of 200 tons at 85 feet reach.

R. E. Wooley, Honolulu, was awarded the contract to build an extension to the foundry at the Navy Yard for $65,000.

An extension of the Fleet Air Base seaplane beach was awarded to **R. S. Finlayson** of Honolulu at $42,200.

Ontario

A public works program involving an expenditure of $38,000,000 and to employ 61,000 men has been announced by the **Ontario Provincial Government.** The various projects comprised in the program would be put under way with the least possible delay. Parts of the Trans-Canada highway, other public highways and country roads are included in the program. The Province is to receive aid from the Dominion Government on the King's highway employment work.

New England Notes

By J. C. ALEXANDER

C. W. Blakeslee & Sons, New Haven, Connecticut and **Blakeslee-Rollins Corp.** of Boston, have been awarded the substructure for the vertical lift railway bridge over the Cape Cod Canal.

P. J. Carlin Construction Co. of New York City was awarded the sub-structures for the two highway bridges over the Cape Cod Canal.

A. G. Tomasello & Son, Boston, have started work on the East Boston-Revere state highway job.

R. G. Watkins & Son, Amesbury, Massachusetts were awarded a section of state highway in New Hampshire.

John Iafolla, Dedham, Massachusetts is making very good progress on his job at New Salem-Orange, Massachusetts. This is the last section of this new road being built under the supervision of the Metropolitan Water Supply Commission. **Carlo Bianchi & Company** have the first section and **V. Barletta Company** the second. This highway is practically being built entirely on new location and will be a very beautiful scenic drive when completed next year.

B. Perini & Sons, Framingham, Massachusetts are going full speed ahead on the Cambridge, Arlington, Belmont job. The landscape will be changed considerably around Spy Pond when this road is completed as the highway will pass along one side of this pond which is being filled in. There is over 500,000 cubic yards of borrow on this job.

James E. Watkins, Amesbury, Massachusetts has started work on their Hooksett-New Hampshire job which was awarded recently.

The annual banquet of the New England Roadbuilders' Association was held Tuesday, December 19, at the Statler Hotel, Boston. A good time was had by all who attended.

New York Notes

A loan and grant to New York City amounting to $23,160,000 has been approved by the PWA conditional on the city furnishing good security and satisfactory assurance that its budget will be balanced and also subject to execution of a contract acceptable to PWA. Work to be done under the allotment includes completion of subway passenger stations, plumbing, controls, escalators, turnstiles and other equipment, laying tracks and third rails throughout tunnels and inspection yards, installing drainage and ventilating equipment, signals and switching operating mechanisms, cables and equipment for transmission and control of power and light, power stations, construction and equipment of car inspection sheds and storage yards. Part of the work is already under construction.

STANLEY V. SPARKS

Stanley V. Sparks, who served for ten years with the Erie Steam Shovel Company and Bucyrus-Erie Company, turned to the construction industry from the sea. He was a graduate of the Pennsylvania Nautical School, operating the schoolship "Saratoga" out of the port of Philadelphia. Upon graduation he worked as quartermaster of the American Liner "St. Louis," between New York and Liverpool. After a preliminary workout on railroad construction near Philadelphia, Stanley joined the staff of the E. E. Smith Construction Co. as team boss, on the Market Street Subway job in Philadelphia. He continued with them as material yard foreman through the construction of the Fourth Ave. Subway in Brooklyn. He entered the contracting business on road work and among other steam shovel jobs, built a fine section of concrete highway on the west bank of the Hudson, south of West Point. He joined the New York City sales staff of the Erie Steam Shovel Company in 1922, and continued with the Bucyrus-Erie Company until 1932. He made many friends in the contracting industry.

He built a fine home of stone masonry, of interesting English design, high up on the side of Pleasant Ridge, near Cresco, in the Pocono Mountains, and it was here that he died. He was injured about six months ago while cranking a tractor, and this led to complications which caused his death.

Born in Philadelphia, in 1883, Mr. Sparks was always interested in athletics and won the amateur welterweight wrestling championship of the Atlantic Coast States in the late 90's. As a member of the Philadelphia Swimming Club he set several middle distance speed records. Of late years he was an enthusiastic gunner, making several trips to Canada for big game. He had some fine trophies of the hunt in his Cresco home. He was an active member of the Crescent Athletic-Hamilton Club of Brooklyn, N. Y.

He is survived by his widow and an infant son, Edward, and by a brother Earl L. Sparks, who is in the advertising business, residing at Sayville, N. Y.

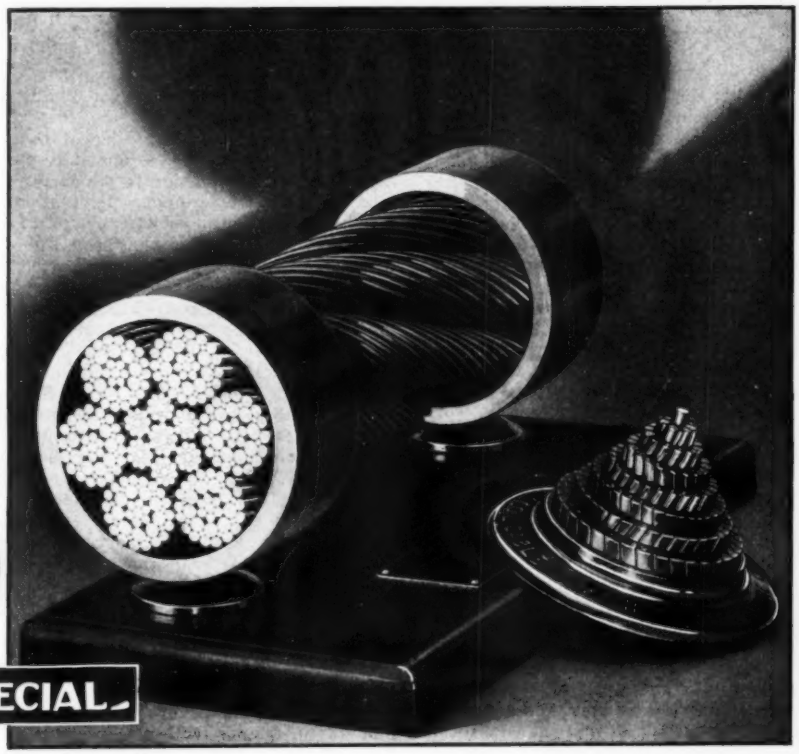
By G. E. PETERSON

New York State Highway lettings since Nov. 14th have included the following jobs: **A. W. Banko Company,** Hastings on Hudson, $194,947 for 1.57 miles 40-foot concrete in Westchester County and also $267,195 for 3.44 miles concrete on the Saw Mill River Parkway in Westchester County; **Tuckahoe Construction Company,** Tuckahoe, $168,639 for 1.94 miles 40-foot concrete Westchester County; **Bersin Engineering Corporation,** New York, $156,452 for grade separation on the Grand Central Parkway; **Wm. P. McDonald** of New York, $260,201 for 8.45 miles 20-foot concrete in Madison and Onondaga Counties; **P. J. Knickenberg,** Buffalo, $204,447 for 5.46 miles concrete in Erie County; **Manitou Construction Corporation** of Rochester, $178,827 for 5.11 miles 20-foot concrete in Genesee and Monroe Counties; **O. P. Williams Construction Company** of Oneonta, $208,425 for 5.45 miles 20-foot macadam in Delaware County; **M. A. Cardo** of Bronx, $178,568 for grading and structures on the Interborough Parkway, Long Island. This job includes 127,000 yards of excavation; **The P. T. Cox Company** of New York, $57,950 for 3 miles grading and paving in Suffolk County; **D'Angelo & Cerretani,** Binghamton, $158,479 for grade separation on Laurelton Blvd., Long Island. This job includes 216,000 yards of excavation, practically all of which is borrow; **J. F. Morgan,** Olean, $201,488 for 5.05 miles 20-foot concrete in Steuben County; **Dale Engineering Company** of Utica, $269,250 for 10.56 miles 20-foot macadam in Genesee County.

The largest excavating job of the year was let on Dec. 19th. This job was 7.24 miles of preliminary grading

NAME THE NEED

STANDARD OR SPECIAL



››› THE RIGHT ROPE IS AVAILABLE

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Shots From the Firing Line—*Continued*

and structures on the Eastern States Parkway in Putnam and Dutchess Counties. This job had 483,550 yards of unclassified excavation.

The Walsh Construction Company was awarded the general contract for grade elimination of the New York Central R. R. through the city of Syracuse. The Walsh bid was $4,021,097 and was submitted along with eight competitive bids, which were opened on December 5th. The job includes 27 bridges and 1,700,000 yards of earth fill. Vice-President Dave Small, in charge of Eastern operations for the Walsh Company, announces that work will commence as promptly as weather permits.

The annual convention of the New York State Chapter of the A. G. C. was held at Syracuse on December 13th and 14th. Addresses by a number of prominent men associated with the construction industry and a very excellent banquet constituted the main events. Cement and steel manufacturers, as well as a number of equipment manufacturers were well represented at the convention. The fact that the 18th amendment was no longer in effect was hardly noticeable in that the convention conducted itself along the same lines as in the past several years.

We again regret to report that **Claude Donohue** of Kingston has not been recovering as fast as we expected and hope that this finds him well on the way to recovery.

New Jersey Notes

State Highway Commission received bids January 2nd on construction of **bridge to carry route 6 across route 2** at North Hasbrouck Heights, Bergen County. The structure will consist of a single span of longitudinal plate girders about 74 feet long with an over-all width of about 65 feet.

The State Highway Commission took bids on December 28th for **a bridge to carry the Lake Hopatcong Road across Route 10** in Morris County. The structure will be a half-through plate girder span about 90 feet in length with a roadway of 24 feet and one sidewalk six feet in width. The quantities include 495 cubic yards of foundation excavation, 1,154 cubic yards concrete, 87 tons of structural steel and 13 tons of reinforcing steel.

Delaware Dredging Company of Philadelphia was the only bidder December 8th at the government estimate of 63.4 cents on 46,100 yards of dredging in Maurice River.

Baltimore and Vicinity

By S. M. CHRISTHILF

Widening of the Chesapeake and Delaware Canal to 250 feet and increasing its depth to 27 feet at a cost of $12,500,000 was brought a step nearer to actuality by a recent approval from the Chief of Engineers and the Secretary of War. The Port of Baltimore has been fighting for an enlargement of this canal for almost a hundred years and the project now requires only the approval of the Public Works Administration and the President. Widening and deepening of the canal would eliminate various delays, accidents and groundings to which the large volume of shipping using the canal is subjected and it is expected to save shippers approximately one million dollars annually. It would shorten the deepwater route to Europe from Baltimore approximately 115 nautical miles and reduce the water distance from Baltimore to Philadelphia from 420 to 104 miles and from Baltimore to New York from 475 to 296.

Another big project for Baltimore which seems to be progressing toward a successful conclusion is the application for a loan of $8,500,000 for construction of the **proposed Chesapeake Bay Bridge**. This has received the approval of the State Advisory Board, Public Works Administration and is awaiting action by officials of the National Administration. The application was filed by the Chesapeake Bay Bridge Company and provides for eventual ownership of the structure by the State. The proposed bridge would connect Baltimore county, via Miller's and Swann Islands, with a point on the Eastern Shore near Tolchester. It would be so constructed as not to interfere with the two channels leading from the bay to the entrance into the Chesapeake and Delaware Canal. It is estimated that the project would employ an average of 3000 men during the 18 months required for construction and in addition would give employment to 3000 more in providing the necessary materials.

Delaware Notes

D. E. O'Connell and Sons of Wilmington were low December 13th on 4.783 miles of dual road from Bishop's Corner to Smyrna at $290,235. 63,000 yards of machine excavation was included at 28 cents and 63,000 hand excavation at 73 cents. 16,850 cubic yards of concrete pavement went at $10.00 per yard and 4,500 square yards of old pavement at 20 cents per.

W. W. Truitt of Lincoln City was low on 1.07 miles of paving through Fredrica at $44,508. 16,000 cubic yards of borrow figured at 35 cents and 2,680 cubic yards of cement concrete at $11.16.

Wilson Contracting Company of Wilmington were the only bidders on the Delaware City bridge approaches at $10,765.

Pennsylvania Notes

Booth & Flinn Company of Pittsburgh was low on the bids for the Montgomery Dam on the Ohio River when the various proposals were opened at the U. S. Engineers' Office at Pittsburgh on December 12th, on the roller gate type bid they bid $2,461,697 and on the lift gate type $2,436,565.

Virginia Notes

PWA has allotted $4,000,000 to the Office of National Parks, Buildings and Reservations to extend a **national park drive** from Shenandoah National Park in Virginia to Great Smoky Mountains National Park in North Carolina and Tennessee. While the exact route has not yet been determined the distance will be about 350 miles. The drive in general will follow the Southern Appalachian Mountain range. The states have agreed to secure and contribute a 200-foot right-of-way to the projects.

Smith, Leach and Boxley Company at Radford was awarded dam for hydro-electric project on the Little River for $66,894.

Arundel Corporation of Baltimore was awarded dredging of the James River below Richmond for $541,000.

North Carolina Notes

By E. F. CRAVEN

At the State Highway and Public Works Commission December 6th at Raleigh, nine highway projects were awarded totaling $350,000. Low bidders were: **Blythe Brothers Construction Company** of Charlotte, relocation of route 20 in Mecklenburg County from Matthews into Union County for $19,086; the structures on this section to **F. A. Triplett Company** of Chester, South Carolina for $8,522; **Hobbs-Peabody Construction Company** of Charlotte, bridge and approaches on route 65 at Plumtree, Avery County for $26,775; **R. B. Tyler Company** of Charlotte and Louisville, surface treatment of route 45 from Conway to the Virginia line in Northampton County for $33,472; also surfacing in Wake County from Wake Forest to Franklin County line for $26,621; also surface route 112 in Jackson and Swain Counties from Cherokee to junction with route 10 for $28,302; also surface road from the Wake County line to Spring Hope running through Franklin and Nash Counties $54,240; **Hardaway Contracting Company** of Columbus, Georgia, surface route 95 in Nash County from junction with route 581 to junction with route 58 for $55,293; surfacing route 48 in Person County from Roxboro to Caswell County line to the **Gregory-Chandler Company** of Virgilina, Virginia $33,983; **T. M. Strider Company** of Nashville, grading, structures and topsoil on route 75 in Moore and Randolph Counties, for $66,714.

Large orders for materials for construction work now going on at the U. S. Army Camp at Fort Bragg have been placed with **Broden Brick and Tile Company** and **Isenhour Brick Company**, both plants being located near Sanford. The Borden Company received orders for 70 carloads of tile while the Isenhour Brick Company secured an order for 75 carloads of brick. These orders will keep the plants operating at full capacity for some time.

Tidewater Construction Company of Norfolk submitted the low bid of $56,320 covering bridge across the Wilker-

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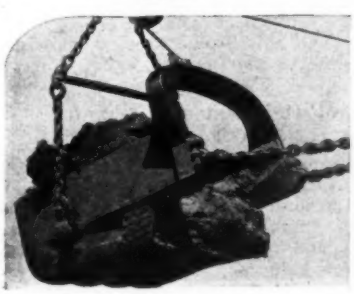

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Shots From the Firing Line—*Continued*

son Creek near Belhaven for the U. S. Engineers.

Wm. Eisenberg and Son, Inc., of Camden, N. J., were awarded the third lock and dam on the Upper Cape Fear River, 20 miles below Fayettville, for $522,000.

GEORGE F. SYME

George F. Syme was accidently killed in a hunting accident November 27th. The passing of Mr. Syme is marked with deep regret by members of the excavating industry.

Mr. Syme had been a part of the North Carolina State Highway Commission since the early beginning of the department. His many many friends will remember him as one who moved quietly around, ever giving his best thought and attention in a sincere, devoted way to accomplishing worthwhile things, never antagonizing, but ever ready to contribute his best in every way to take the kinks out of the complexing problems that come into public activities.

ARTHUR G. ELLIOTT

It is a peculiar coincidence that on the same date and almost at the exact time of Mr. Syme's death, Arthur G. Elliott, also hunting, was also killed by the accidental discharge of his own gun. Mr. Elliott entered the contracting field a number of years ago as a member of the R. G. Lassiter organization. In 1922 he became a partner in the partnership of Elliott & Sholes and a few years later associated himself with F. J. McGuire of Norfolk. At the time of his death he was still actively engaged in this chosen profession. Arthur Elliott was a man of few words but alert and prompt to do whatsoever his hands found to do with diligence and devotion in doing it well. His home town paper called him "Washington's most civic-minded person."

Florida Notes

Army engineers are to make further study on the **cross Florida canal** on the basis of providing a 30-foot instead of a 35-foot channel. President Roosevelt feels the additional cut would probably be of insufficient value to justify the additional expense.

Alabama Notes

By W. BURR CULLOM

Construction work has started on a temporary camp to provide living quarters for workers on the **Joe Wheeler Dam** across the Tennessee River a few miles above the Wilson Dam at Muscle Shoals. A transmission line is being built to carry Muscle Shoals current to the Joe Wheeler site, 17 miles upstream.

Louisiana Notes

Forcum-James Company of Dyersburg, Tennessee was recently awarded 4.83 miles of grading and draining for $24,285.

Meyer Greenwald Construction Company of Monroe was awarded 4.877 miles of concrete paving at $161,881.

By ERNEST W. FAIR

The Kelleher Construction Company, Dallas ,is building the Bonnett Carre spillway bridge over the floodway between New Orleans and Baton Rouge on the new airline highway.

Gifford, Hill and Co., Inc., Dallas, are doing levee work on the Mississippi River, Bailey River, New Orleans District Number Two.

Jack Harris of New Orleans was low bidder for constructing an embankment for a railroad approach to the eastern end of the Public Belt Commission-Louisiana Highway Commission Mississippi River bridge at New Orleans.

Kentucky Notes

By W. E. CHAMBERS

Tentatively awarded to **Monarch Stone Company**, Fort Mitchell, 5.8 miles surfacing of Grants Lick-Peach Road for $26,293; **N. E. Stone & Company**, Madisonville, awarded surfacing four-tenths of mile Town of Fredonia (Ollie James Highway) for $13,635; **Ralph E. Mills Company**, Frankfort, grading and draining 2.9 miles Cave City-Hiseville Road at $10,595; **Ruth Brothers**, Frankfort, grading and draining three miles of Grayson-Sandy Hook Road and 3.2 miles of Jonesville-Williams town road at a total cost of $62,967; **Cole & Moore**, Paducah, bridge on Hopkinsville-Clarksville Road $15,960; **Cumberland Construction Company**, Burkesville, grading and draining 2.7 miles on Burkesville-Tompkinsville Road in Cumberland County and 2.3 miles on the same road in Monroe County at $66,899; **J. R. Breeden**, Carlisle, steel bridge and earth approaches over Louisville and Nashville Railroad tracks on Carlisle-Flemingsburg Road $6,887; **Robert M. Robinson**, Owensboro 2.5 miles surfacing on Harlan-Pennington Gap Road and 2.5 miles on Barbourville-Hyden Road at $40,590; **D. L. Walker & Company**, Lexington, 5.9 miles surfacing on Barbourville-Williamsburg Road; $35,541; **William A. Dean**, Berea, deck girder bridge and earth approaches over Silver Creek, Richmond-Berea Road, and two-tenths miles of grading $15,027; **R. F. Pryor and Company and K. V. Johnson**, Mayfield, 3.5 miles grading and draining on Hardin-Eggners Ferry Road, $136,981; **Wilmore Paving Company**, Middletown, Ohio, surfacing 6.2 miles of Maysville-Vanceburg Road $117,401; **Clevinger & Day**, West Liberty, grading 2.1 miles on West Liberty-Sandy Hook Road $34,646; **Cundiff, McDowell & McGrath**, Somerset, deck girder bridge and earth approaches over North Elkhorn Creek on Georgetown-Paris road $19,525.

Mississippi Notes

By ERNEST W. FAIR

J. W. Spence is doing grading and drainage work on U. S. Highway 51 in Copiah County.

The Wright Construction Company has finished grading and drainage work on U. S. Highway 45 in Lauderdale County.

Cobb Brothers Construction Company has finished grading and drainage in Lauderdale County on U. S. Highway 45.

Tennessee Notes

PWA has allotted to Memphis a $100,000 loan and grant for a river front drive. $522,000 will also be furnished for an administration building.

Roberts Paving Company of Salisbury, Md., was recently awarded two paving projects of 8.945 miles and one of 5.63 miles on bids of $189,526 and $102,051 respectively.

By W. BURR CULLOM

Nashville voted $3,900,000 bonds for various civic improvements including several new schools, fire halls, street paving, sewers, an incinerator and a new viaduct over the railroad terminals at Demonbreun Street to relieve heavy traffic on Broadway and Church streets. Letting of contracts will be in February.

Foster and Creighton, Nashville, received the general contract for two homes for the aged to be built from funds from the Annie L. Horton estate jointly with an appropriation from PWA. The total involved is $557,000. This firm will do the excavating for $5.00 for rock and $1.10 for dirt. Donald Southgate, architect; Emmons L. Woolwine, associate.

George H. Wells, PWA engineer from Washington, is in charge of state PWA work, pending appointment of a successor to Col. Harry S. Berry, resigned.

Colonel Simpson, Atlanta, is in charge of CWA engineering. He was appointed and on the job before the profession was aware that there would be an engineer on this work. CWA got under way with a bang and due to open winters in this state there will be little interruption to work on account of bad weather. No snows before Christmas, as a rule.

Frank W. Webster, chief of the State Highway Department, is busy with a large number of projects that will do much to maintain the reputation of Tennessee highways. Its system is second to none in the South. A great deal of work is planned for the region of the Smoky Mountain Park in which roads have been and are being built to make this scenic section more accessible to tourists.

Pittsburgh and Vicinity

By C. E. ASHCRAFT

The excavation contract for Dam No. 3, Allegheny River, has been sublet by the general contractors, Seeds and Derham, Philadelphia, to **R. H. Cunningham and Sons Co.**, Turtle Creek. Total yardage in job, as estimated by gov-

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and the greatest mining operations, Western dump cars are hauling rock, dirt, ore and gravel with economy and efficiency to the profit of their owners. Tunnel cars for the Colorado River Aqueduct, cars for hauling the gravel and excavation at Boulder Dam, cars that built the Cincinnati Union Railway Terminal, cars working at Flin Flon Mines, the toughest job in North America, all came from the "Western" shops. The reputation of Western Dump Cars for offering the utmost in low cost haulage is based on their remarkable records on the toughest jobs.

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Shots From the Firing Line—*Continued*

ernment engineers, 254,600 yards. Of this approximately 206,000 yards consists of a cut through an island in the middle of the river through which the dam will run. Excavated material at island to be disposed of on top of island. **Seeds and Derham** bid 36 cents per yard, including disposal, being low of five bids on excavation item as well as entire job. Subcontractor's price has not been announced.

Bids for construction of Montgomery Dam, Ohio River, were opened at U. S. Engineer Office, Pittsburgh, December 12. Low bidder was **Booth and Flinn,** Pittsburgh, who are now engaged in building the Montgomery locks. Their bid on two alternative types of dam was $2,461,697 and $2,436,565. Excavation, as estimated by government engineers, amounts to 303,500 yards, common and 12,000 yards, rock. Booth and Flinn's bid was 33 cents per yard for common and $4.30 per yard for rock.

Ohio Notes

Adding further stimulus to the combined program of the State Highway Department to put as many jobless men back to work as possible under the NRA, NRS and CWA, **contracts estimated at $879,387 were scheduled to be let** by O. W. Merrell, Ohio Highway Director, December 29, for the construction of National Recovery Highway projects totaling about 20 miles.

Thirteen previous NRA highway lettings have already been held by the Highway Department, resulting in employment for thousands of unemployed. In addition, approximately 35,000 men have been put to work on highway jobs under the CWA program, which Governor White hopes will have provided jobs for most of Ohio's unemployed before the holiday season is past. About 5000 men are also employed on national recovery secondary highway projects, $650,000 having been appropriated for the construction of 83 jobs.

Indiana Notes

By C. BRUCE McCOWN

The "event of the month" was the **meeting of the Indiana Highway Constructors, Inc.,** at the Hotel Claypool, Indianapolis, December 6th and 7th. Included in the program was an outstanding talk on widening state highways with hand labor by James D. Adams, Chairman of the State Highway Commission. Mr. Adams showed how this work, which cannot be done with machines, is one of the most economical places where hand labor can be used. The wide shoulders increase traffic safety, explained Mr. Adams. He also stated that the Department is using, wherever available, contractor's foremen and idle help to supervise the hand labor crews.

R. O. O'Connor of J. C. O'Connor and Sons, Fort Wayne presented a very interesting paper on "Methods of Control for Lower-than-cost Bids."

John Wheeler of the Indiana State Highway Commission spoke on "Our 1934 program and plans concerning it." He said about $18,000,000 will be available for Indiana's 1934 road program. Of this NRH will furnish $4,700,000; NRM $4,800,000; NRS $500,000; to these the General Fund for State new construction would add about $8,000,000. This is exclusive of money to be spent for hand labor on widening roads and constitutes the largest program ever attempted by the state of Indiana.

Prominent contractors attending the meeting included: President Edgar Traylor of Evansville, Vice-President John J. Quinn of Bedford, Secretary-Treasurer Fred Cunningham of Indianapolis and Executive Secretary W. M. Holland of Indianapolis, Ernst and John Berns of Berns Construction Co., Indianapolis; Bill Brand and Clarence Deal of Brand and Deal, Columbia City; Charles Rosenbarger, Mr. Hild and Mr. Henderson of Brown-Rosenbarger Gravel Co., Indianapolis; Harry Carpenter of Brazil, Roger Daoust of Defiance, Ohio; George Sparling of Fort Wayne, John Dehner of Fort Wayne, "Chuck" Gast of Gast Contracting Co. of Warsaw, Edgar Traylor of Globe Construction Co., Evansville; Ray Harris of Fort Wayne, Walter Meitz, Bob and Henry Moellering of the Moellering Construction Co., Fort Wayne; Morius Hart of Robinson, Gregory and Company and Hart and Hart of Columbus, Mr. Gunsaullus of Rosenberry and Gunsaullus, Inc., Butler; and Harry Bollinger of Tri-Lake Construction Company, Columbia City.

The meeting closed with a banquet Thursday night and election of officers for next year. All the officers were re-elected for another year.

Highway letting was advertised for December 29th, at which jobs totaling about $1,000,000 were to be let.

Great Lakes Dredge and Dock Company of Chicago was awarded 1,181,000 yards of dredging in Calumet Harbor for $487,161.

Fitzsimmons and Connell also of Chicago received 2,063,000 of Calumet Harbor dredging at $701,420.

Thomas Jenkins has just returned to the states after spending four years with the Anglo Chilean Nitrate Corporation at Maria Elen. He was master mechanic of mining operations. He is now residing at Winamac, Indiana.

Michigan Notes

By CLYDE B. DAVIS

Michigan's next large transportation project is expected to be a **23-mile structure bridging the Straits of Mackinac** at a cost of about $10,000,000. Authorization by the next session of the Legislature, at the suggestion of Gov. Comstock, is counted upon. The Governor for some time has been going over the project with engineers. The bridge would reach from Cheboygan to Bois Blanc, to Round Island and then to Mackinac Island, with a final span reaching to St. Ignace. The finance committees of the two branches of the Legislature have been in conferences with the governor on the entire public works program.

Under the Federal public works allotment for the state, the Federal Public Roads Bureau Dec. 7 **approved 19 projects** totaling about 33 miles, estimated to cost $1,265,000, the largest of which is $545,000 for concrete grade separation in Detroit. Contracts will be let as soon as possible.

The Federal government has **refused to widen US16** through the village of Portland at a cost of $50,000 because the Grand River bridge, only 20 feet wide, would constitute a bottleneck for the 40-foot highway. A relocation is almost certain, which will take the highway two miles south of the village.

Railroads will start preliminary work about Jan. 1 to support their tracks during the bridge construction near Milwaukee Avenue on the widening of Woodward Avenue. The plans for a clear span type of bridge, doing away with a supporting pier in the center, have been approved by the Federal government. Detailed plans will be ready for bidders early in January and actual work on the project will be underway in about 45 days, or within a month after the plans are ready. This span will cost close to $600,000. Razing of buildings on Woodward Avenue is underway and shovels will soon be at work.

Illinois Notes

The PWA has allotted a loan and grant of $33,948,000 to the **Sanitary District of Chicago.** The work covered includes construction of four sections of the West Side intercepting sewer, completion of the Calumet treatment works, construction of four Calumet intercepting sewers, three additional sections of the West Side intercepting sewer, construction of pumping station and other structures, connection conduits for the West and South Side sewage treatment works. All contracts will be let and disbursements made under supervision of government engineers. Money now available will finance the district's program for the next two years.

Lake Forest is to be furnished $338,000 for **water improvements** by the PWA.

November awards of the Department of Public Works, Division of Highways included: **Moore Brothers Construction Company** of East St. Louis, pavement on Route 12, $44,842; **Universal Paving Company,** Oak Park, pavement on Route 42A, $87,857; **Hartmann Clark Brothers,** Peoria, bridge on Route 80, and 115VB, gravelling on Route SA 17A, SA 6, SA 21, and pavement on Route 161 at a total cost of $142,166; **Gund Graham Company,** Freeport, pavement on Route 79, $5,222; **Thos. McQueen,** Forest Park, bridge on Route SA 10 and 29 and grav-

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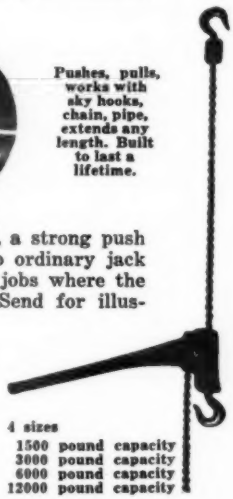

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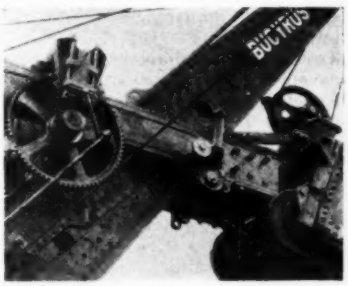

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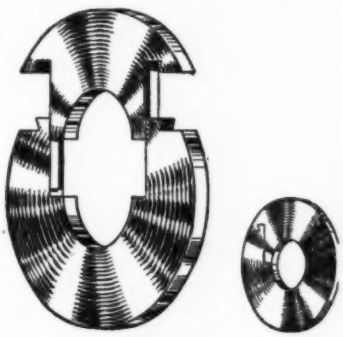

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- ☐ Jacks
- ☐ Hand Hoists
- ☐ Asbestos Packings
- ☐ Flexible Metallic Packings
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Shots From the Firing Line— *Continued*

elling on Route 46, $74,602; **Triangle Construction Company**, Kankakee, retread on Route SA3, $15,283; **Illinois Valley Construction Company**, Ottawa, gravelling on Routes SA 22, SA 22, SA 16, paving Route 30, $152,306; **Mautz & Oren, Incorporated**, Effingham, gravelling Route SA 7 and 13, $27,646; **Birt Brothers**, Decatur, gravelling Route SA 32, $53,284; **Nelson, Mullen & Webster**, Winchester, paving Route 100, $84,848; **Arcole Construction Company**, Niles Center, pavement on Routes 57, 1 and 6, $507,929; **Milburn Brothers**, Rockford, pavement on Route 23, $80,073; **Louis Rich Construction Company**, East St. Louis, grading Route 100, $158,007; **Jas. Kesl & Sons Company**, Edwardsville, pavement on Route 4, $8,812; **H. J. Eppel**, Kewanne, pavement on Route 4, $7,554; **Jansen & Schaefer**, Pekin, gravelling Route SA 17 and 18, SA 1A, $36,275; **Parham Construction Company**, East St. Louis, bridge on Route 159, $11,954; **Churchill Gravel Company**, Pontiac, gravelling on Route SA 6, $38,276; **S. J. Groves & Sons Company**, Libertyville, bridge on Route SA 6, $11,000; **A. P. Munsen**, Moline, bridge on Route 178, $38,905; **R. McCalmann, Incorporated**, Danville, bituminous surfacing on Route 1, $17,640; **Aldrich Construction Company**, Chicago, pavement on Routes 6 and 18, $296,534; **Pickus Engineering and Construction Company**, Chicago, pavement on Routes 48 and 50, $242,310; **Hoeffken Brothers**, Belleville, pavement on Route 13 and bridge on Route 13, $128,869; **R. P. Devine**, Watseka, pavement on Route 1, $74,714; **Cameron Joyce & Company**, Keokuk, pavement on Route 8, $40,216; **H. L. Roberts**, Rushville, gravelling on Route SA 5, $38,387; **Waukegan Construction Company**, Mundelein, gravelling on Route SA 13, $46,229; **Airey Construction Company**, Oak Park, bridge on Route SA 13, $9,623; **J. Mackler & Company**, Chicago Heights, bridge on Route 13, $25,285.

Bids were received December 28th at Springfield for 22 paving projects, 1 grading job of 69,600 yards and 8 bridge jobs.

Wisconsin Notes

By MORT HUNTER

Wisconsin, like all other states, had quite an increase in activity due to the C.W.A. program of the Government and, while most of the work is hand labor, it is taking thousands of men off the relief payrolls of the cities and counties, saving to those cities and counties such moneys as they are able to collect on their taxes and enabling them once more to resume their normal functions of government, to pay their firemen, policemen and teachers and even do some of the normal construction work that they couldn't do when loaded down with relief payrolls.

This, in our opinion is going to have a far-reaching effect on maintenance work and new construction for the coming year everywhere, because with this relief burden on their backs, no community could undertake their normal repair of streets, sewers and other public improvements in the cities and public works of all kinds throughout the state.

In addition, the Government is letting a number of large jobs along the Mississippi River in western Wisconsin. **Jutton-Kelly Company** of Milwaukee, was awarded Lock No. 8 near Genoa, Wisconsin, at $1,421,762. **United Construction Company** have a large job at Alma, Wisconsin, well over a million dollars. **Spencer, White & Prentis** were awarded Lock No. 6 at Trempealeau, for $1,286,427. **Merritt-Chapman & Whitney** were awarded Dam No. 5 near Fountain City, Wisconsin, for well over a million dollars. There have been a number of small bridge jobs let as well as some fairly good-sized ones of about $160,000 each to Wisconsin Bridge & Iron Company and Worden Allen Company. The work on which bids are being called for is steadily increasing, so that we look for fairly active business conditions in the spring of 1934.

St. Louis and Vicinity

By A. J. KOENIG

The Missouri State Highway Commission received bids on Dec. 8th on 213 miles of new road construction involving expenditures of $2,119,000. 427 bids were received. **Kelly & Underwood** were low with a bid of $281,513 on 10.77 miles of 20-ft. concrete slab. **Carte-Harlin Construction Company** bid $22,550 on 8.2 miles graded earth in Oregon county; **E. K. Porter** was low with a bid of $39,623 on 9.4 miles graded earth in Oregon county; **Hoover Bros.** bid $46,217 on 15.8 miles graded earth in Henry county. **E. D. Tyner** was low bidder on 13.5 miles graded earth and 10-ft. concrete slab in Mercer county, with a bid of $161,452. **Davis Construction Company Inc.** bid $22,489 on .674 miles 24-ft. concrete slab in Boonville.

Another letting will be held at Jefferson on Dec. 21 involving **150 miles of road work** throughout the state. The work comprises 64 projects and the estimated amount is $2,393,000. Twenty-eight miles will be concrete, fourteen miles of black top, thirty-three miles of gravel, seventy-four miles of graded earth and thirty-three bridges and culverts.

Cameron-Joyce & Co. were awarded contract for concrete paving in Warren county, Illinois. **Hoeffken Bros.** have contracts for two slabs jobs in St. Clair county. **S. J. Groves & Sons Company** have contract for a bridge in Livingston county. **A. P. Munsen** was awarded contract for a bridge over the Vermillion River in LaSalle county. **Thornton & Company** have contract for 0.75 miles concrete slab in Douglas county.

Trinidad Asphalt Company was low bidder for the paving of Fourteenth St. in St. Louis. Its bid of $17,666 was 5 per cent under the City Engineer's estimate.

R. C. Micotto Construction Company was low bidder for the construction of a down-town relief sewer on Clark Ave. Its bid of $41,782 was 38 per cent above the engineer's estimate.

Minnesota Notes

Contractors recently successful in obtaining state highway department contracts include **Adolpson & Husetti**, Thief River Falls; **Erickson, Johnson & Fraser**, Minneapolis; **S. J. Reading**, **Nelson Bros.**, Wilmar, and **Chas. Weaver**, Anoka; **Minneapolis Bridge Co.**, Minneapolis and **McCree & Company** of St. Paul.

Kansas Notes

By ERNEST W. FAIR

The J. A. Tobin Construction Company of Kansas City has begun work on Kansas 10 between Tonganoxie and McLouth.

M. A. Penney, Lawerence, is finishing the gap in Leavenworth County on U. S. 73-E.

R. G. Aldrich, Kansas City, is building a bridge and doing culvert and earth work on Kansas 11 in Louisville in Pottawatomie County.

Other highway work in progress: by **C. J. McCoy** of Emporia in eastern Chase County from the Lyon County line west to Saffordville; **C. J. McCoy** in western Lyon County from Sterry Crossing to east Chase County line; **Geiger and Rutherford** of Leavenworth earthwork and culverts on No. 50-S between Florence and West Chase County line in east Marion County; **W. B. Honska** of Salina, a bridge on the aforementioned project; **C. E. Gray** in Gray County; **Blue Valley Gravel and Sand Company** in Nemaha County; **Manhattan Construction Company** in Ruley County and **Collins Construction Company** in Leavenworth County.

Texas Notes

By G. A. CARLSON

E. H. Reeder, Dallas, an "oldtimer" in the storm sewer game, landed the first of the large storm sewer jobs let in Dallas under funds from **PWA**. This is the first job Mr. Reeder has had in Texas in a number of years. He has moved back his equipment from Knoxville.

Frank Parrott of Dallas and **McKenzie Construction Co.** of San Antonio and Dallas have also secured storm sewer work in Dallas.

Perry McGlone, Kansas City, shipped down his 37-B Bucyrus-Erie shovel (which has been converted to a dragline) for his two sections of Gregg County highway construction near Longview. Superintendent McGuire is in charge of the job which involves approximately 600,000 cu. yds. of dirt work.

The Sternburg "duplex," a Bucyrus-Erie Diesel-electric dredge has several million additional yards of excavation ahead of it in the **Houston Ship Channel** as a result of recent lettings.

Among the larger jobs to be let at Austin January 8th will be the contract

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Shots From the Firing Line— *Continued*

for Dallas' triple underpass permitting Main, Elm and Commerce Streets traffic to quickly reach the new Commerce Street cutoff of the Dallas-Fort Worth Pike road. The job necessitates considerable shifting of track and high embankment for all the railroads coming into the nearby Dallas Union Terminal.

George Sullivan is assisting his dad, Vernon Sullivan, engineer for the Red Bluff Dam at Pecos which S. J. Groves and Son are starting early this month. **C. E. Armstrong and Son** of Pecos will do part of the dirt work. Bucyrus-Erie 43-B and 37-B shovels will do most of the excavating.

J. Lee and **E. A. Vilbig** have started on their highway grading at Zapata on the Mexican Border. There are less than 3,000 inhabitants in the whole county, mostly Mexicans who saw their first shovel when Edwin had their Lorain walked 40 miles from Laredo, the nearest railroad station.

Southwestern Portland Cement Co. of El Paso is enthusiastic about the economies effected with their new Bucyrus-Armstrong Model 26 electric blast hole drill.

Central Bitulithic and Uvalde Construction have started paving the 40′ remaining sections of the Fort Worth-Dallas Pike and Dallas cutoff. Dwight Horton's organization will put in paving brick on a concrete base in the cutoff while Bitulithic are laying asphaltic concrete on the main Oak Cliff section.

W. F. "Bill" Wise, President of Southwest Stone Company, and several times President of the National Crushed Stone Association is recuperating rapidly now after spending most of last month in Baylor Hospital at Dallas. Bill was returning to Dallas from a sectional code meeting at Joplin but could not convince a big, wide, freight truck that he was entitled to any of the highway. Even while laid up he continued to direct his business and further the organization of the crushed stone and gravel producers.

Willacy County Water Control & Improvement District No. 1 at Raymondville in the Lower Valley got favorable recognition from the P.W.A. and **Trinityfarm Construction Company** will soon be at work completing this immense district which they started several years ago.

Forty-eight different projects were awarded at the last December Texas State Highway Letting on December 18 and 19 with about as many more scheduled for the January 8th letting.

Under contract recently awarded by the Federal Government, the **Atlantic, Gulf and Pacific Dredging Company,** with two dredges, is making rapid progress in widening the Galveston Bay section of the channel from 250 to 400 feet and deepening from 30 to 34 feet. It is expected that contracts will be awarded early in the new year for deepening the entire project to 34 feet.

Standard Dredging Company of New York was awarded dredging of 2,230,000 yards in Sabine-Nechey Channel for $255,000.

The Brownsville Navigation District of Cameron County, Texas received a loan and grant of $2,472,000 for construction of a ship canal 100 feet wide, 25 feet deep and 15 miles long.

The Neuces County Navigation District has received a loan and grant from the PWA of $200,000 for a ship canal.

Matagorda County secured $104,500 from PWA for **road construction.**

Oklahoma Notes

The Stanolind Pipe Line Company has begun work on a 44 mile 8 inch pipe line from the Lucien pool of Noble County to the main trunk system near Cushing and will soon start a 6-inch line to the gathering system at Paradise, Kansas.

By ERNEST W. FAIR

M. A. Swatek and Company, Oklahoma City, is doing highway and city road work in and about Oklahoma City.

The Manhattan Construction Company of Oklahoma City is erecting barracks at Fort Sill.

Gaus-Culligan Company of St. Paul, Minnesota, has been given contracts for mountain road work on 14 between Roosevelt and Mountain Park.

G. J. Bowie, H. R. Ketchum and **E. K. Fibson** of Tulsa have incorporated the C. J. Bowie Construction Company of Tulsa with a capital stock of $25,000.

River Notes

During October river **contractors placed 15,077,937 yards in levees** while the government crews placed 584,238 yards. In addition dredging projects moved 5,418,662 yards and 1.7 miles of mattress and paving was placed on banks.

Rock Island District

Bids for Lock 11, about 3.3 miles upstream from Dubuque, will be opened January 11th. The main lock will be 600 by 110 feet, the auxiliary 360 by 110. Guide walls will be 600 feet. Common excavation totals 112,000 yards, fill 192,000. There is 197,860 feet of timber piling and 87,400 square feet of sheet steel piling. Derrick stone totals 1,690 yards, rip rap 6250, concrete 84,935 yards. There is 939 tons of structural and 541 tons of reinforcing steel.

Bids for Lock 12 near Bellevue, Iowa will be opened January 23rd. The main lock will be 600 feet long by 110 feet wide and the auxiliary lock 360 by 100 feet. Guide walls will be 600 feet long. Quantities involved include 15,000 yards common excavation, 100,000 yards of fill, 240,750 feet of timber piling, 95,350 sq. feet of steel sheet piling, 1,710 feet of derrick stone, 6,750 feet rip rap, 79,215 yards of concrete, 932 tons structural and 558 tons reinforcing steel.

Bids were taken December 21st for **Lock 22** near Saverton, Missouri. The main lock will be 600x110 feet with an auxiliary 380x110 feet. Overall length including 600 foot guide walls is 1,940 feet. Work involved includes: 914 lineal feet of coffer dam, 25,400 cubic yards common, 22,400 rock excavation, 64,460 yards fill, 21,529 lineal feet timber piling, 960 square feet sheet steel piling, 7,713 yards rip-rap, 73,731 yards concrete, 972 tons structural and 650 tons reinforcing steel, together with various other items.

Bids were taken by Major Wheeler's office on December 15th for **test borings at sites of dams 16 and 21 and also Lock and Dam 23** on the Mississippi. The total work on the three jobs amounts to 1010 lineal feet of overburden drilling and 470 lineal feet of rock drilling. Dam 16 is approximately three miles upstream from Muscatine, Iowa and 25 miles below Rock Island, Illinois. Dam 21 is about 2 miles downstream from Quincy. Lock and Dam 23 are about 4 miles downstream from Louisiana, Missouri or about 5½ miles upstream from Clarksville. On the latter the lock will be adjacent to the Missouri bank from which the proposed dam extends across the river from the upper end of Cash Island to the abutment on the Illinois side.

Rock Island office takes bids to January 3rd for construction of **Lock 18** on the Mississippi about 7 miles upstream from Burlington, Iowa. The main lock will be 600 feet by 110 feet and there will be an auxiliary lock 380 feet by 110 feet. Each guide wall will be 600 feet long giving an overall length of main lock and guide wall of 1940 feet. Principal quantities include 938 lineal feet of cofferdam, 60,000 cubic yards of common excavation, 55,000 cubic yards of fill, 233,685 lineal feet of timber piling, 91,500 square feet of steel sheet piling, 1,720 cubic yards of derrick stone and 7,720 cubic yards of rip-rap stone, 75,000 cubic yards of concrete, 844 tons of structural steel, 494 tons of reinforcing steel together with various other items. .

St. Louis District

Bids will be received January 5th for 630,000 yards of levee work in two items in the Clear Creek Drainage and Levee District in Union and Alexander Counties, Illinois. The work starts about 2 miles east of Reynoldsville and extends about 3 miles north along Clear Creek.

Memphis District

There will be a heavy letting at Memphis January 3rd when bids will be opened on: 900,000 yards of loop levee at Porter Lake, Arkansas; 366,000 yards and 995,000 yards enlargement at Connell Bend Lake near Hughes, Arkansas; 180,000 yards of loop levee at Whitehall, Arkansas; 298,000 yards enlargement below Whitehall, Arkansas; 1,618,000 yards enlargement at Humpy Point, Arkansas; 2,293,000 yards new levee at Hollywood, Mississippi; 1,155,000 yards new levee at Tunica, Mississippi; 965,000 yards new levee at Westover, Arkansas; 394,000 yards enlargement at Countiss, Arkansas; and 836,000 yards enlargement at Laconia, Arkansas.

Foster Creighton Co. of Nashville bid $179,203 for low on the concrete and steel seawall in front of Hickman, Kentucky. 182,000 yards of earthwork in connection with this wall will go at 28 cents a yard to one of two bidders who tied at this figure; Tully-Costello Co. of Chicago and J. L. Ward Construction Co. of Helena, Arkansas.

The annual meeting of the **Mississippi Flood Control Branch of the A. G. C.** will be held at Hotel Peabody, Memphis, January 2nd. Special effort will be made to get senators and representatives at work to secure funds for the 1934 working season from the balance of the Public Works Fund before it is exhausted.

New Orleans District

Bids were called during the holiday season for 11,300,000 yards including 4,800,000 yards on the Mississippi opposite Natchey and at Deer Park; 4,100,000 yards of dredging and clamshell work on the Atchafalaya from Charedon to Verdemville and from Little Bayou Pigeon to Old River; 2,400,000 yards on the ring levee at Melville, La. Completion date will be December 1, 1934.

Ed Burke has moved from Springfield, Illinois to near Cary, Mississippi. He is running a 50-B Bucyrus-Erie for Lewis Chambers Company.

Arkansas Notes

By ERNEST W. FAIR

The Hogan Construction Company has finished highway work between Bentonville and Gravette.

Rucke-Brandt Construction Corporation has finished highway work near Berryville.

D. F. Jones Construction Company of Little Rock is doing 7 miles of highway work on 67 in Randolph County.

New Mexico Notes

Recent awards by the State Highway Department include: 10,046 miles of asphalt surface to **O. A. Peabody** of Las Cruces; 0.448 mile of grading and a bridge to **Armstrong & Armstrong** of Roswell; .471 mile of grading and bridge to **J. H. Miller Company** of Denver; grading and paving on 1.566 miles to **Hayner & Burns** of Las Cruces; grading and railroad overpass on 2.754 miles to **Henry Thygeson** of Albuquerque.

South Dakota Notes

By PAUL G. FRIGGENS

Highway contracts totaling $225,000 were let by the South Dakota state highway commission in regular session here in December. Highway engineers said part of the work on which bids were let will be started this winter, if weather conditions permit. The awards follow:

Grading—9.854 miles on State 37 south of Huron in Sanborn County to **T. A. Pasco**, Viborg, $21,564; 5.786 miles on Bonilla-Lake Byron road in Beadle County to **J. C. Borah**, Huron, $15,999; 7.702 miles east of Martin on U. S. 18 in Bennett County to **Smith and Marlin**, Gering, Nebraska; 7.036 miles from Norris north in Mellette County, **R. P. England and England & England**, Murdo, $31,223; Hand: 9.132 miles north of Vayland in Hand County to **Davis Gustafson**, Centerville, $14,614.

Bridge—80-foot bridge and two box culverts on State 37 south of Huron in Sanborn County to **F. I. Cummins Construction Company**, Sioux Falls, $9,791.

Gravel, Basecourse—3.123 miles on U. S. 14 east of Cavour in Beadle County to **Bert Vander Schaaf**, Hull, Iowa, $9,883; 6.959 miles on U. S. 14 between Iroquois and Manchestef, Kingsbury County, **J. L. Healy Construction Company**, Manchester, 14,922.

Graveling—10.563 miles on U. S. 18 between Minnekahta and Edgemont, Fall River County, award held up; Meade and Ziebach: 7.437 miles on Faith-Philip road north of Four Corners Bridge in Meade and Ziebach Counties to **A. E. Wiley Construction Company**, $17,189; 17,530 miles on State 24 south of Faith in Meade County to **W. E. Bartholow & Son**, Huron, $20,628; 1.667 miles on State 65 north of McIntosh in Corson County to **S. J. Morrisey**, Summit, $3,764; 6.954 miles on county road north of

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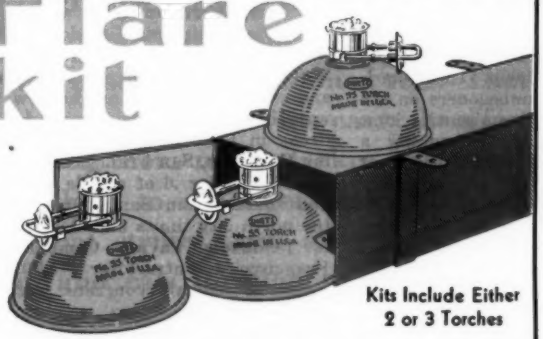

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Shots From the Firing Line— *Continued*

White in Brookings County to **Frank Schuknecht, Parker,** $4,745; 6.002 miles on Mathews-Esmond road in Kingsbury County to **J. L. Healy Construction Company,** Manchester, $6,852.

$96,000 has been appropriated and contract will be let this winter for the remaining 10 miles required to complete the 30 miles of state highway through the "Badlands." The stretch to be built follows the run of the Badland's wall across Big Buffalo Creek and doubles back to connect with the Highway 40 at the bottom of Big Foot Pass.

Wyoming Notes

By PAUL G. FRIGGENS

Applications for two public works loans totaling $122,750 have been placed in Washington from the Wyoming Public Works Advisory Board. One application asks $110,000 for the construction of two supplemental reservoirs on Clear Creek and Sourdough Creek twenty miles southwest of Buffalo. The other was for a $12,750 loan to the city of Lander for a municipal improvement program which includes a municipal park, an airport, golf course and swimming pool.

First actual construction work in the great **Casper-Alcova irrigation and power project,** which will cost about twenty-two million dollars, has begun. Excavation was started at the east end of the 1,350-foot diversion tunnel, the only portion of the work which has been let.

Colorado Notes

By H. M. BIBAUD

Public Works officials in Washington are quoted as saying that the proposed Veba-Sylvester reservoir above Creede is regarded as a Federal project the same as the Casper-Alcova and is now under consideration on that basis. An application for a grant of $3,441,000 from the Federal Works Board for the reservoir was submitted recently to George M. Bull, Colorado State Public Works Engineer, by the Commissioners of Alamosa, Rio Grande and Saguache counties and has been forwarded to Washington.

$2,725,000 was allotted by the Public Works Administration, December 6 for **construction of the Taylor Park reservoir** on the Taylor River above Gunnisom. Two million dollars will be used for the reservoir and the remainder for canal and tunnel improvements. The reservoir will have a capacity of 106,000 acre feet.

Arizona Notes

By H. M. BIBAUD

Contract for 22.25 miles of road on the Prescott-Ashfork sector of U. S. Highway 89 has been awarded to the **Lee Moor Contracting Company** of El Paso. Contract price was $420,544. Work includes grading, draining, structures and oiling.

The New Mexico Construction Company of Albuquerque, N. M., received contract for grading and draining 20 miles on U. S. Highway 80, starting at the Lee's Ferry bridge and running southward toward Flagstaff. The contract was for $199,245.

The contract for the grading, draining and oiling of 25.8 miles of road on the Casa Grande-Gila Bend road went to **Gogo and Rados** of Los Angeles for $239,239.

Preliminary work on the $18,912,000 Verde River Irrigation and Power District project has been started. Engineers and Surveyors recently looked over the dam site on the Verde River to secure full information for appraisal purposes on the lands which will be flooded and other data needed for the designing of the dam. R. B. Williams, engineer of the U. S. Reclamation Service is supervising the construction of the 80,000 acre project.

Construction of the Nogales Flood Control Project began November 24. The project is being constructed by the U. S. International Boundary commission at a cost of $443,000. The American and Mexican commissioners on the international commission signed a joint report November 12th embodying a plan for certain flood control works at Nogales, Arizona. Work on the Mexican side will follow later. Digging of the main channel will begin about January 24, 1934.

Three states, Arizona, California and Nevada, **held a joint celebration** recently at Willow Beach, Arizona in honor of the actual starting of the work on the $2,000,000 Kingman-Las Vegas highway. Two new tractors, a two-yard steam shovel and other road equipment has been moved to a point about 15 miles from Boulder Dam where $177,000 will be spent in construction the first three-mile unit of the road. The new highway when completed will be about 75 miles long. It will cut the distance from Kingman to Las Vegas about eleven miles. The road will be 24 feet wide and eliminate curves that exist in the old road. Officials of Six Companies, contractors for the first unit, accompanied the distinguished visitors on a tour of inspection over points of interest in the section.

Nevada Notes

Union Paving Company of San Francisco, with a bid of $253,579, was awarded reconstruction in Washoe County, between Vists and Clark.

Dodge Construction, Incorporated, of Fallon, received contract for reconstruction in Clark County between Bard and Las Vegas on a bid of $210,819.

San Francisco and Vicinity

By H. L. LIVINGSTON

The following contracts have been awarded by the U. S. Bureau of Public Roads, San Francisco: to **Heafy-Moore Company,** Oakland, who bid $172,289, for placing crushed rock base on Sections C and D, and bituminous surface treatment on sections A, B, C and D in the Sierra-National Park; to **C. W. Wood,** Stockton, who bid $98,087, for grading Section A of the Blythe-Needles highway in Riverside and San Bernardino Counties.

The following contracts were awarded by the California Division of Highways at Sacramento: to **Fredrickson & Watson,** Oakland, 4.6 miles of grading and crusher run base on the new highway between Middletown and Putah Creek in Lake County; to **Union Paving Company,** San Francisco, a contract for $43,620 for .6 of a mile of grading and surfacing in Santa Cruz between the north city limits and Ocean Street; to **Peninsula Paving Company,** San Francisco, a contract for $74,907 for 5 miles of asphalt concrete paving in

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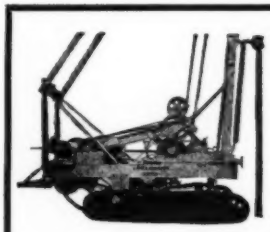

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Shots From the Firing Line—*Continued*

Alameda and Contra Costa Counties.

A Chicago-type, double-leaf, bascule bridge is contemplated across the Oakland Tidal Canal at Park Street between Oakland and Alameda. Bids for this work will probably be called for within the next 60 days. The estimated cost of this bridge is $650,000 of which $190,000 is a grant from the PWA., the balance to be financed by the county.

The PWA. has allotted $100,000 to the **Bureau of Reclamation** for engineering studies, plans, specifications and estimates for the Parker-Gila Irrigation Project in Arizona. This project would irrigate about 100,000 acres near Parker, Arizona and 250,000 acres in the Gila Valley from the Colorado River water.

On December 19th the City of Eureka voted a bond issue of $925,000 for improvements to the City water system. Work involved includes a concrete-arch dam 180 feet high, a 9-foot, concrete-lined tunnel 2300 feet long, 12,400 feet of 16″ pipe, 45,270 feet of 24″ pipe and 1,020 feet of 10″ pipe. The PWA. will be asked to take the bonds and grant an additional $209,000 for the project.

George Pollack, Sacramento, has been awarded a contract by the Public Works Officer, Mare Island, California in the amount of $236,720 for constructing an 1800 ft. extension to dike 12 at the Mare Island Navy Yard.

Idaho Notes

J. W. Brennan of Pocatello was low bidder for grading and draining 6.5 miles of highway and 3 timber bridges. **J. M. Sharp** of Boise was low on concrete culverts.

Oregon Notes

At the bidding December 7th the Oregon State Highway Commission made the following awards: **Mountain States Construction Company** of Eugene, bridge over Yellow Creek on the Elkton-Sutherlin Secondary Highway near Elkton $14,294; also bridge over the Applegate River on the Medford-Provolt Secondary Highway near Provolt for $33,806; also bridge over Williams Creek on the Williams Secondary Highway for $15,623; **Theo. Arenz** of Portland, 1.06 miles of concrete pavement and .12 mile of crushed rock or gravel surfacing on the Rice Hill Section of the Pacific Highway $41,400; also a .95 mile job of grading and paving of Winston Bridge Section of the Pacific Highway for $51,601; **R. P. Stuart & Sons** of Medford, pavement widening and concrete curbs on the South Roseburg Section of the Pacific Highway for $10,187; **Northwest Roads Company** of Portland 9,800 sq. yds. bituminous macadam and 2,300 lineal feet concrete curbs and gutter on the Arlington Section of the Columbia River Highway for $6,645 also 15,500 sq. yards bituminous macadam on the Condon Section of the John Day Highway for $7,410; **Morrison-Knudsen Company** of Boise, 3.76 miles of grading Stinkingwater Mountain Section of the Central Oregon Highway for $116,907; **United Contracting Company** of Portland 9,500 sq. yds. asphaltic concrete pavement and 2,700 sq. yds. rock shoulders on the North Ashland Section of the Pacific Highway for $23,649; also 9,600 sq. yds. asphaltic concrete pavement on the Grants Pass Section of the Pacific Highway for $17,287; **Ernest C. Hall** of Eugene 6,400 sq. yds. concrete pavement and 1,550 lineal feet concrete curbs on the South Medford Section of the Pacific Highway for $19,037; **G. I. Stebbins Construction Co.**, bridge over U. S. R. S. Canal on the Dalles-California Highway near Klamath Falls for $16,991; **Barham Bros. & Henningsen**, bridge over Santiam overflow channel on the Albany-Lyons Secondary Highway for $7,860; also bridge over McCarty Creek on the Columbia River Highway for $7,311; **H. B. Morton** of Clarkston, Washington the Sanderson Bridge Section of the Albany-Lyons Secondary Highway consisting of 1.8 miles of grading and surfacing for $17,811; **J. A. Lyons** of Portland, 2.18 miles of grading and surfacing on the Cummings Hills Section of the Nehalem Secondary Highway for $41,786; **Shattuck and Neland**, bridge over Chehalem Creek on the Yamhill-Newberg Secondary Highway for $3,980. The mile of regrading and bituminous macadam on the Ontario Section of the Old Oregon Trail will be readvertised as all bids were rejected.

Awards were held pending on the following jobs on which the low bidders were: **Hoffman Construction Company** of Portland low at $91,127 on the bridge over Vermont Street Gulch and bridge over Newberry Street Gulch on the Fourth Street Extension of West Side Pacific Highway in Portland; **Johnston, Hanson & Johnston** of Birkenfeld, low for $19,873 on the bridge over Beneke Creek on the Nehalem Secondary Highway at Jewell; and **Tom Lillebo** of Reedsport low at $52,748 on the Hoffman Bridge over the Coquille River on Powers Secondary Highway near Myrtle Point.

The Oregon State Highway Commission took bids December 28th and 29th on 15 bridges and 11 highway projects.

The Bureau of Reclamation receives bids January 16th for the Agency Valley Dam on the Vale Project. Work will include 35,000 cubic yards stripping, 2,800 yards tunnel excavation, 626,900 yards general excavation, 2,500 yards backfill, 480,000 yards earth fill and 105,500 yards concrete.

Seattle and Vicinity

By C. M. LITTELJOHN

The largest excavation of the entire Pacific Northwest began without pomp and ceremony, and in a blinding snowstorm early this December, when the steam shovel took its first bite of earth at Grand Coulee, Washington, where the world's greatest power plant will be constructed to ultimately generate two million horsepower, and revolutionize by irrigation of a large area the agricultural, industrial and economic life of a large Basin region. **David H. Ryan**, contractor, however, marked the mouthful of earth taken by the first of his steam shovels in this initiation of the site with considerable interest. Before long he will have a fleet of fifteen steam shovels gnawing away in hefty chunks the more than four million cubic yards of rock and dirt on this location. Grand Coulee Dam sets in motion $63,000,000 of government money to carry out this huge project at which the excavating crew alone will be busy for the next four months. Rumsey & Co., of Seattle, dug the preliminary test pits and exploration trenches, and moved their equipment away while Lynch Brothers, also of Seattle, are nearing the end of their core drilling, expecting to finish about the first of the year, when there will be revealed in detail the type of foundation and strata reaching far beneath the surface of the huge dam. As an electrical project Grand Coulee will dwarf other world-famous plants. As against the two million horsepower ultimately to be harnessed by Grand Coulee for the productivity of a whole new region, there is the famous Russian Dneiper River plant, which has an ultimate horsepower of 756,000, while the Hoover Dam provides for 1,200,000 and the Muscle Shoals only 600,000 horsepower.

The General Construction Co., Seattle, was recently awarded the $668,500 contract for excavation work on the Bonneville Dam site on the Columbia River, at Bonneville, Washington, the U. S. War Department at Washington, D. C., making the award.

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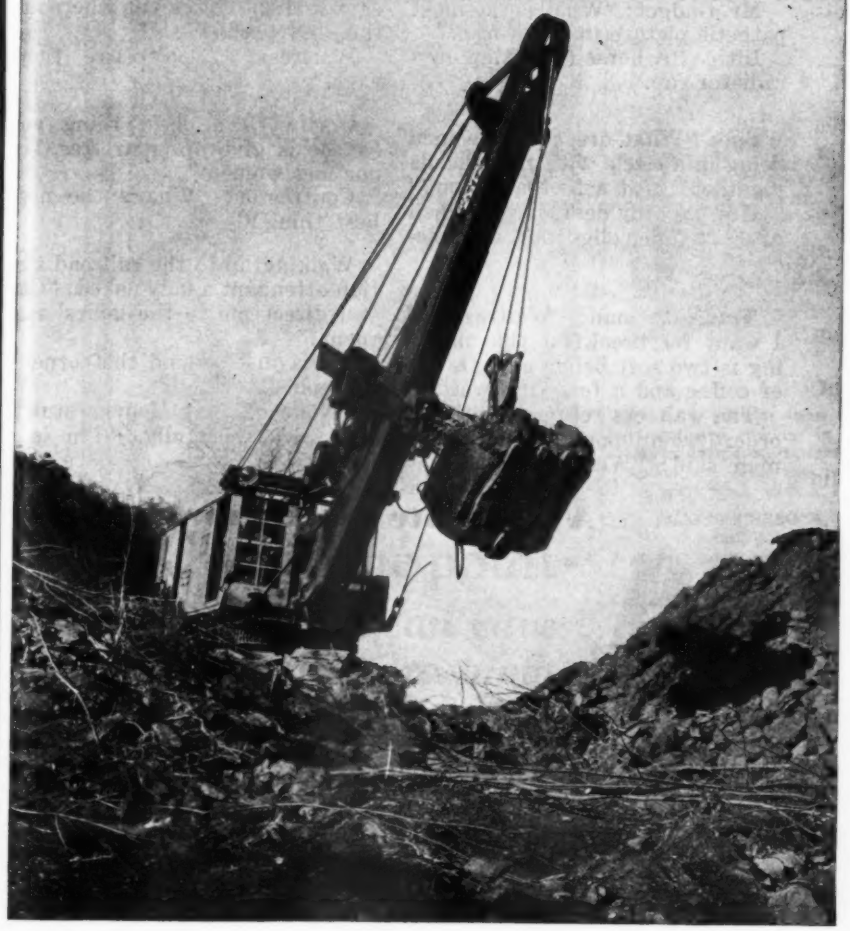

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Not in the Contract

Contractor's wife: "It's a bottle of hair-tonic, dear."

Contractor: "Oh, that's very nice of you, darling."

C. W.: "Yes, I want you to give it to your typist at the office. Her hair is coming out rather badly on your coat."

Alex: "Just coming from the bank? So ye have money to put away?"

Donald: "I didna put money in the bank."

Alex: "Then ye drew some out, or borrowed?"

Donald: "Nae. Neither."

Alex: "Ah, weel, an' what did ye there?"

Donald: "I fill it my fountain pen."

Mr. Gadget: "What is the most pathetic picture in the world?"

Ditto: "A horse fly sitting on a radiator cap."

She: "What are all those men doing in a circle with their heads together? Is it a football team?"

He: "No, my dear, just a bunch of Scotchmen lighting a cigarette."

Traveling man: "Waitress, all I want for breakfast this morning is two soft boiled eggs, a cup of coffee and a few kind words."

The waitress returned with his order whereupon the traveling man said: "Well, here are the eggs and the coffee but where are the kind words?"

Waitress: "Don't eat them eggs."

Doctor: "The best thing you can do is give up cigarettes, liquor and women."

Contractor: "What's the next best thing?"

Walking up to the railroad station attendant a lady asked: "Can you direct me to the ladies' rest room?"

"It is just around the corner," he replied.

"None of that Hoover stuff!" she said resentfully. "I'm in a hurry."

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ONE COMPLETE NARROW GAUGE DIRT MOVING OUTFIT including shovel, camps, shop and haulage equipment. Located near Fort Wayne, Indiana. Can you use it?

54 Steel bunks with mattresses and bedding. Mattresses and bedding are sewed up in burlap.
6 Heating stoves.
50 Shovels and picks, approximate.
5 Wagons and boxes. Light wagons about 2¾ axles.
1 Fairbanks Morse gasoline engine and 5x5 bulldozer pump 3 HP.
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4 Track jacks, 15 ton.
3 Track jacks light.
1 Duplex Pump—Worthington, 5¼x 3-½x5.
10 Slips.
1 Anvil.
1 Forge.
6 Switches.
4 Frogs.
10 Switch points.
2 Wheelbarrows.
2 Each, scythes, hand saws, cant hooks, spike malls.
1 Carbide light.
1 Kitchen outfit.
1 Set boiler tubes for steam shovel.
30 Western dump cars, 5-yard.
2 Davenport locomotives, No. 2039 and No. 2040, weight about 20 tons.
1 36x84" vertical boiler.
1 6" centrifugal pump with upright engine attached.
2 Galvanized water tanks, wagon size.
100 Timbers, 10x12x16'.
12 Timbers 10x12x32'.
1 Chevrolet touring car, 1924 model.
1 Ford 1-ton truck.
1 Best Caterpillar tractor (30).
About 800 pieces of pipe, size 1½ and 2", random lengths.

Will consider individual sale of separate items.

Address Box 449 ME.

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A Footnote to Faunae

By Stanley Donaldson

"Would you tell me, Mister Erie," said the lady from the Packard,
"If you ever dig up secrets in the digging that you do?"
"Very often, Miss," said Cheyney, for her face was nicely lacquered.
"But 'tis mostly in my leisure." And he took another chew.

"I should think you'd show more int'rest—something more than being busy.
"Everything that was is waiting for the keen-eyed in the ground."
"Oh, I'll grant you that; but lady, too much lookin' makes me dizzy.
So I've missed the dirt in writin' spread upon the rocks I've found."

"I'd advise you, Mister Erie . . ." "Then I guess I'll have to tell you
. . . Though I didn't aim to tell it and I've never told a man—
Once when I was clammin' oysters in a river called the Smellit,
I drug out a monster fossil and the blasted thing—it ran!

"There was scarcely time to view it, for the thing left in a hurry.
I can't give no ac'crit outline, only that it wasn't small.
And I didn't see its features—though that weren't my greatest worry,
For it took my outfit with it, clamshell bucket, ropes and all.

"Well, I started out a trackin' (that lost bucket made my wages)
But I searched along the river and there weren't a single track!
So I says to me, 'Young Feller, who are you to daunt the Ages?
Lady, there's another story . . . but those trucks are comin' back."

Then the lady watched the liar while his thin hand at a lever
Turned the slack to easy cushions as the shovel came about.
"Oysters with a clamshell bucket! All but that part was most clever!"
But the crowding engine chuckled as the lean, old sticks ran out.

He saw the point• *and Cordeau gave him an extra profit*

A highway job near Wilkes Barre, Pa., required a side cut 400 yards long, containing 11,760 cu. yds. of rock. Ground sloped to the west, and the problem was to load and fire the shot so as to remove as much material as possible in this direction, and avoid handling.

Drilling was continued until a total of 1,186 holes had been made: 121 6″ well drill holes, 469 2½″ wagon drill holes, and 596 jackhammer holes. 23,750 lbs. of powder was used, and the hook-up required 15,000 feet of Cordeau-Bickford Detonating Fuse.

A perfect shot was obtained. Approximately 5,000 cu. yds. of rock was lifted clear of the right-of-way and deposited over the lower slope. This fact in itself was a big saving, justifying the use of Cordeau. In addition, however, was the fact that the shovels, air compressors, drilling equipment, pipe lines, tractors, etc., which under the old plan of three blasts would have had to be removed *three* times, were able to remain in place until the one giant blast was ready.

Frankly, only with Cordeau-Bickford Detonating Fuse would a giant blast such as this be practicable. The savings—the *extra* profit—were therefore due to the use of Cordeau. The Ensign-Bickford Company, Simsbury, Conn.

A new technique in blasting — free to executives.

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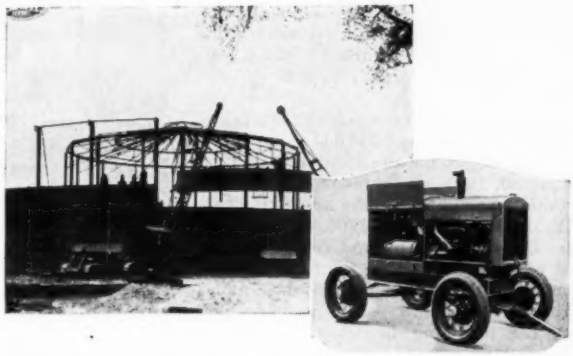

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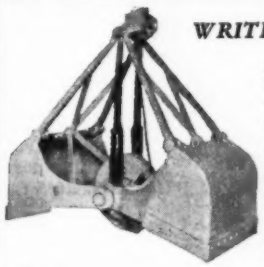

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Excavation for 1934 Highway Construction

(Continued from Page 19)

The program calls for the construction of approximately 38 miles of surface-treated gravel and 47 miles of high grade pavement such as bituminous macadam, reinforced cement concrete and bituminous concrete on concrete base.

Appropriation for bridges for the fiscal year 1933 was $300,000.

The budget for the fiscal year ending June 30, 1935, as submitted, calls for a total expenditure of approximately $2,300,000 of which $900,000 is asked for the construction and reconstruction of roads and $300,000 for bridges. This budget will be included in the annual appropriation bill to be passed upon by the incoming Legislature in January, 1934.

South Carolina

State Highway Engineer Chas. H. Moorefield summarizes the activities of the State Highway Department during the period of the last report, that is, from October 1st, 1932 through June 30, 1933 as follows:

Construction Expenditures ---------- $2,659,956.76
Maintenance Expenditures 1,005,549.34

Construction work completed during the year:

Bituminous Surfacing ------- 80.6 miles
Earth Type ---------- 14.2 miles
Number of Bridges --------- 29

(This includes only projects, or sections of projects, entirely completed and which have been taken over for State maintenance.)

Status of the State Highway System as of June 30, 1933:

Completed—

	miles
Concrete Pavement ----------	2,380.87
Bituminous Surfacing -------	876.8
Improved Earth Types -------	1,565.65
	4,823.32
Under Construction—	
Concrete Pavement ----------	13.4
Bituminous Surfacing --------	339.8
Improved Earth Types -------	21.2
	374.4
Unimproved ----------	763.38
Total ----------	5,961.1

The only definite program in view for 1934 is the completion of U. S. Public Works National Recovery Program, involving approximately $5,459,000. Of this program the Department already has construction under way, or has received bids, for work estimated to cost approximately $3,100,000.

South Dakota

The State Highway Department will have available for construction during 1934 at least $4,800,000 of Federal funds. This alone represents an increase of 50 per cent over the amount available for the 1933 program. Present plans for use of this sum as reported by H. E. Abell, Office Engineer, call for 450 miles of grading new roads with 3,600,000 yards of excavation and to cost $730,000; 100 miles of reconstruction and widening involving 1,200,000 yards of excavation and $300,000 expenditure. Surfacing 700 miles with gravel or crushed stone will cost about $770,000; oil treatment of 300 miles is estimated at $1,500,000; while 60 miles of paving will run to $1,500,000. In addition to this work there is carried over on old contracts 1,100,000 yards of excavation to cost $187,000.

Better farm to market road for Colorado County, Texas. A 35 Allis-Chalmers tractor pulls an Allis-Chalmers No. 10 grader.

Tennessee

1934 highway construction is expected to show an increase of at least 40 per cent over 1933 according to Frank W. Webster, Commissioner of the Department of Highways and Public Works. Tennessee has at this time available $7,000,000 of NRA funds to make this possible. Mr. Webster expects that, of this, $2,000,000 will go to grading 250 miles of new roads; $1,000,000 will go for 50 miles of reconstruction and widening; $3,500,000 will be spent on 150 miles of high type paving; $1,000,000 will go into low type paving, and $400,000 will be used for bridge construction.

Texas

The statement of cash receipts and disbursements issued by E. J. Amey, Statistical Engineer, shows that the amount expended for construction for the fiscal year ending August 31, 1933 was $28,480,466, which is approximately the same amount as expended in the previous year. Although the Texas Highway Department's revenue has been decreased approximately $7,500,000 through the diversion of 1c of the gasoline tax to a special fund for the retirement of county and road district bond indebtedness, and has also been reduced to the extent of county participation in the cost of construction, the Department was able to spend practically the same amount for construction as in the previous year because of the fact that the cash balance on September 1, 1932 was $11,468,433 while on August 31, 1933, it had been reduced to $4,026,959. By drawing on the cash balance in this way the Highway Department was able to keep construction on the same level as in the previous year.

Projects under construction on November 30, 1933 show $18,588,223 worth of work in progress consisting of: 1,027 miles grading and small structures costing $8,913,745; 12.7 miles of gravel, caliche, disintegrated limestone or shell surfacing amounting to $909,155; 21 miles macadam for $115,537; 470 miles of single bituminous treatment to cost $1,270,000; 131 miles of double or triple bituminous treatment to cost $857,861; 100 miles of various types asphaltic surfacing, $1,402,986; 165 miles of reinforced concrete at $3,272,313; and one-third mile of brick on concrete to cost $21,213. In addition bridges, under and overpasses are underway to cost $1,825,419.

This statement represents both NRA and State projects and possibly a few Federal projects under the previous Emergency allotment. The amount allotted to Texas under the National Recovery Act is $24,244,024. Up to and including December 9th, contracts had been let amounting to $11,955,556 of which amount approximately $10,000,000 is Recovery funds and the balance State funds. Projects have been advertised for two lettings in the month of December, on the 11th and 18th. These total about $2,707,200 which, when added to the amount already let, will make a total of $14,662,756. This leaves a balance of approximately $9,500,000 still to be placed under contract. It is expected by Mr. Amey that this entire amount will have been placed under contract by the end of January, 1934.

In the month of September, construction work was, of course, at a low point since projects let under previous Federal Emergency allotments were practically completed and since the first Recovery projects let in this State in August, 1933, were not yet under way. In the month of September, 6,200 men were employed on construction contracts, while in the month of November, this amount had increased to 9,800, an increase of over 50 per cent.

During the fiscal year ending August

Assignments under the $400,000,000 Federal Highway Fund are divided into three general classifications. Class 1, involving projects on Federal-Aid Highways outside of cities, totals $185,807,671; Class 2, covering extensions of Federal Aid Highways into and through Municipalities, totals $113,515,642; Class 3, covers projects on secondary or feeder roads and involves expenditure of $94,676,687.

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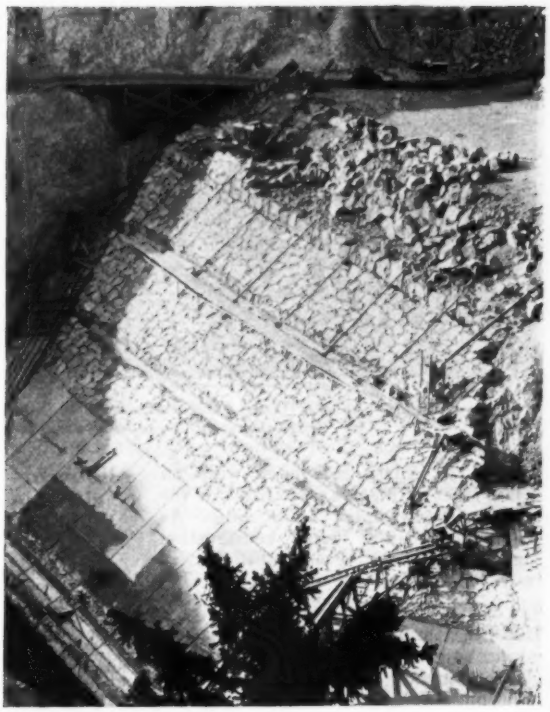

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Rock may be tipped or rolled; it may be picked up even when closely surrounded by other pieces. It is laid down exactly in place without resetting, shifting or jacking. Releasing the closing line immediately frees the lifted object.

Just as a clamshell closes with tremendous power to scoop up its load, so the Bucyrus-Erie Rock Grab closes, but with this fundamental difference: the clamshell closes around its load, the Rock Grab pinches its load and lifts entirely by friction. It is not necessary to get the jaws under the load; any two approximately parallel sides, that may be spanned by the jaws, may be used for contact.

BUCYRUS-ERIE COMPANY
South Milwaukee Wisconsin

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For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

A new grade for an old West Virginia road was furnished by Wm. F. Allen of Clarksburg and his Bucyrus-Erie 37-B.

31st, 1933, Texas completed work on 2,609 miles of highway, lettings for the same period totaled 1,428 miles. As mentioned before total construction underway as of November 30th showed work on 2,042 miles.

Utah

Chief Engineer H. S. Kerr has in sight some $2,000,000 to finance his 1934 program. This consists of $1,700,000 of NRA and $300,000 of State funds. It is impossible to say at this time whether additional funds will be forthcoming from State or Federal sources to equal the $3,300,000 used by Utah highway construction annually for the past two years.

With the two million Mr. Kerr expects to grade some 15 miles of new roads requiring excavation of 350,000 cubic yards and costing $150,000. Grading for reconstruction and widening will cost about $450,000 which will take care of about 50 miles and require movement of 600,000 yards of dirt. $450,000 for gravel and crushed stone surface on 100 miles; $350,000 for 150 miles of oil treatment; $250,000 for 10 miles of high grade paving; $50,000 for 5 miles of low grade; with $300,000 for bridges, completes the present program.

There is also a run-over from 1933 of about 500,000 yards of excavation on present contracts to cost some $150,000.

Vermont

Available for highway construction during 1934, Vermont expects to have available $1,878,000. Of this $1,300,000 will be NRA funds and about $564,000 from State revenues.

Work is scheduled so far on these funds on about 80 miles of highway including grading involving 300,000 yards of excavation to cost some $479,000; gravel or crushed stone costing $30,000; high type paving for $572,000; low type paving $312,000; bridges to cost $40,000. Most of this scheduled work is on NRA projects.

Allotments of the $400,000,000 Set Aside for Public Highways Under the NIRA of June 16, 1933

State	Seven-eighths according to Sec. 21 of Federal Highway Act	One-eighth according to population	Total Apportionment
Alabama	$ 7,311,792	$ 1,058,341	$ 8,370,133
Arizona	5,037,757	174,203	5,211,960
Arkansas	6,006,653	741,682	6,748,335
California	13,336,793	2,270,561	15,607,354
Colorado	6,460,275	414,255	6,874,530
Connecticut	2,223,075	642,665	2,865,740
Delaware	1,723,750	95,338	1,819,088
Florida	4,644,637	587,197	5,231,834
Georgia	8,927,956	1,163,229	10,091,185
Idaho	4,308,263	177,986	4,486,249
Illinois	14,518,964	3,051,806	17,570,770
Indiana	8,742,635	1,295,208	10,037,843
Iowa	9,067,432	988,228	10,055,660
Kansas	9,337,317	752,287	10,089,604
Kentucky	6,471,680	1,045,679	7,517,359
Louisiana	4,988,079	840,512	5,828,591
Maine	3,050,995	318,922	3,369,917
Maryland	2,912,014	652,513	3,564,527
Massachusetts	4,897,508	1,699,592	6,597,100
Michigan	10,799,586	1,936,641	12,736,227
Minnesota	9,631,141	1,025,428	10,656,569
Mississippi	6,174,867	803,808	6,978,675
Missouri	10,728,776	1,451,530	12,180,306
Montana	7,224,738	215,010	7,439,748
Nebraska	7,277,858	551,103	7,828,961
Nevada	4,509,499	36,418	4,545,917
New Hampshire	1,723,750	186,089	1,909,839
New Jersey	4,729,747	1,616,292	6,346,039
New Mexico	5,623,633	169,302	5,792,935
New York	17,295,626	5,034,475	22,330,101
North Carolina	8,254,372	1,267,921	9,522,293
North Dakota	5,532,151	272,297	5,804,448
Ohio	12,826,310	2,658,282	15,484,592
Oklahoma	8,258,525	958,273	9,216,798
Oregon	5,725,439	381,457	6,106,896
Pennsylvania	15,039,039	3,851,965	18,891,004
Rhode Island	1,723,750	274,958	1,998,708
South Carolina	4,763,763	695,402	5,459,165
South Dakota	5,734,381	277,098	6,011,479
Tennessee	7,446,153	1,046,466	8,492,619
Texas	21,914,486	2,329,538	24,244,024
Utah	3,991,599	203,109	4,194,708
Vermont	1,723,750	143,823	1,867,573
Virginia	6,448,161	968,596	7,416,757
Washington	5,490,602	625,265	6,115,867
West Virginia	3,782,655	691,579	4,474,234
Wisconsin	8,549,454	1,175,427	9,724,881
Wyoming	4,411,114	90,213	4,501,327
Dist. of Columbia	1,723,750	194,719	1,918,469
Hawaii	1,723,750	147,312	1,871,062

"Not less than 25 per cent of the apportionment to any State shall be allotted to projects on extensions of the Federal-aid highway system into and through municipalities; not more than 50 per cent shall be allotted to projects on the Federal-aid highway system outside the corporate limits of municipalities; and not more than 25 per cent shall be allotted to secondary or feeder roads, as provided in the rules and regulations."

$6,000,000 was reserved for Federal engineering and administration.

Virginia

The Department of Highways expects to have available for construction $9,816,757 according to Auditor C. J. Allard. This is an increase of about 7½ per cent over 1933. NRH funds furnish $7,416,757 of the total, to which is added estimated gas tax receipts of $2,400,000. A detailed forecast of the work to be carried out with these funds is not available at this time.

Washington

It is expected that all of the State's $6,155,000 allotment of National Recovery funds will be obligated and placed under contract by about the first week in January. Of this fund, it is estimated that about $800,000 will have been earned on contracts before January first, leaving about $5,355,000 in uncompleted National Recovery projects to be carried over into 1934.

In addition to the above, L. V. Murrow, Director of Highways, expects to have available for Highway construction about $5,600,000 of State and Bond Issue funds and about $1,500,000 of Federal Grant funds during 1934.

West Virginia

The State Road Commission anticipates that there will be available for West Virginia highway construction during 1934, $7,500,000. Of this $1,800,000 represents the balance of NRA funds, $5,000,000 PWA loan and grant, $750,000 state allotment for prison labor to be used for half grading and half stone base. In addition work totaling about $2,500,000 on NRA contracts is carried over to 1934.

Wisconsin

Progress on the U. S. Public Works program financed by National Recovery funds to date shows that $5,000,000 of the total of $9,724,000 has been placed under contract. Present plans are that the remaining work will be placed under contract at the rate of approximately $1,000,000 to $1,500,000 worth of work per month. Many of the contracts recently let provide that work be started in the spring of 1934 as soon as weather conditions permit. According to E. L. Roettiger, Assistant Engineer of Construction, recent reports indicate that approximately $2,000,000 has been earned on U. S. Public Works projects up to December 1. From the foregoing it will be seen that approximately $7,000,000 worth of this work will be performed during 1934, either in the form of carry-over contracts or new contracts.

It is impossible to forecast at this time what additional funds will be available for highway construction.

Wyoming

James B. True, State Highway Superintendent, advises that Wyoming began awarding contracts under the NIRA early in August, 1933. The work under this Act has been planned and placed under contract as rapidly as

In spite of heavy rains and stiff going through red and black clay, this new road in Skamania County, Washington, known as "Farm to Market Road No. 4" must go through. Geo. Hazard uses this Caterpillar Diesel Seventy-Five with Master Bulldozer for the performance.

possible. The location of the work was determined with respect to the need of the improvement of the State Highway System and with respect to the need of men who were out of employment.

Where State funds were available, State projects have been developed and placed under contract. But a small amount of the 1932 emergency funds, due to under runs, were available for the 1933 program.

Funds appropriated under the NIRA for Wyoming were as follows:

National Recovery Highway Projects ---------$2,250,000
National Recovery Secondary Projects ----- 1,125,000
National Recovery Municipal Projects -------- 1,125,000

At the first letting under this program in August, due to restrictions on machinery and apparent hand labor requirements, contractors bid high and only five of the fifteen projects were awarded by the Commission. At the next letting, these rejected projects were awarded at lower figures. At this letting thirteen out of the fifteen contracts were awarded, indicating that the balance of estimates and bid prices were again running closely together, or within the legal limit of five per cent.

Under the various appropriations, work has been awarded as follows: (The figures are approximate.)

National Recovery Highway Projects: 36 miles of grading, $195,000; 145 miles of surfacing, $285,000; 295 miles of oil treatment, $1,175,000; bridges, $65,000.

National Recovery Secondary Projects: 88 miles of grading, $456,000. 8 miles of surfacing, $55,000 and $36,000 for bridges. In order to accelerate construction activity on secondary or feeder roads, the Bureau of Public Roads issued an order allowing force account work on simple types of construction on approval of the U. S. District Engineer. Work under this order is included in the above figures.

National Recovery Municipal Projects: 1.5 miles of grading, $17,550. 1.2 miles of surfacing, $8,000. 3 miles of oiled surfacing, $65,000. 6.7 miles of bituminous macadam pavement, $222,000. Sewers, $46,000 and bridges $5,000.

National Recovery Federal Land Highway Projects: 44 miles grading, $130,000. 31 miles surfacing, $125,000. 22 miles oiling, $51,000 and bridges $23,000.

State Projects: 23 miles grading, $135,000. 45 miles surfacing, $75,000. 4 miles oiling, $26,400 and bridges $50,000.

Under the National Recovery Highway Projects, several contracts have been completed as follows: 9.7 miles of oiling in Converse County, 8.8 miles of surfacing in Fremont County, one bridge in Niobrara County and 15.5 miles of base course surfacing in Sweetwater County.

Fully 80 per cent of Wyoming's Recovery program has been approved by the Bureau of Public Roads, and during the next few months all should be under contract. As much work as possible is being carried on during the winter months.

It is impossible to forecast at this time what new State or Federal funds will be available for 1934 construction.

FOR SALE

Crushing and Sizing Plant

NEW ● MODERN ● COMPLETE
ALL-STEEL

Capacity, 225 tons per hour. Suitable for crushed stone, slag, sand and gravel, or for crushing and screening other material. New machinery, driven by independent motors, 3-phase, 440-volt, 60-cycle push button remote control. Attractive price, liberal terms.

THE DETROIT SLAG AND DOCK CO.

845 Hanna Building Cleveland

The position of the army is shown in a statement by the War Department in approving the uniform size and weight restrictions recommended by the American Association of State Highway Officials:

"Highways designed to safely carry vehicles of the weights and sizes provided in the recommended code, it is believed, will be adequate for the War Department needs in time of war or national emergency. In the opinion of the War Department, proper provision would not be made for the national defense if our major highways were designed for vehicles of smaller dimensions or weights."

American Highways

THERE follows a summary of the annual survey of highway mileages by types of construction as reported by the Foreign Construction Division of the United States Department of Commerce. The figures present the mileages in 1931.

AMERICA	Unimproved Earth and Non-Surfaced	Improved Earth, Sand-Clay, Gravel, Graded and Drained	Macadam Surface Treated Water Bound Macadam	Macadam Surface Treated Penetration, Bituminous Concrete and Sheet Asphalt	Cement Concrete	Block-Stone, Wood, Asphalt and Brick	Not Specified	Total
Alaska	.....	1,751	.....	.....	.....	.....	.....	1,751
Argentina	90,000	44,580	.....	.....	.....	.....	2,597	137,177
Bahamas	.....	.....	.....	200	.....	.....	.....	200
Barbadoes	.....	.....	460	20	.....	.....	.....	480
Bermuda	.....	.....	.....	.....	.....	.....	100	100
Bolivia	1,166	1,627	.....	.....	.....	.....	992	3,785
Brazil	57,109	12,650	500	49	64	.....	.....	70,372
British Guiana	.....	.....	.....	.....	.....	.....	500	500
Br. Honduras	13	52	.....	.....	.....	.....	.....	65
Canada	158,640	226,583	.....	6,437	2,696	.....	17	394,373
Chile	20,654	1,252	.....	51	.....	.....	137	22,094
Columbia	15,693	3,321	.....	.....	.....	.....	247	19,261
Costa Rica	.....	65	45	48	16*	.....	174	358
Cuba	.....	51	1,435	934†	1	20	.....	2,441
Dom. Repub.	1,500	.....	783	62	.....	.....	.....	2,345
Ecuador	2,232	1,578	.....	.....	.....	.....	.....	3,810
French Guiana	28	.....	.....	.....	.....	.....	.....	28
Guadeloupe	396	.....	.....	200	.....	.....	.....	596
Guatemala	.....	.....	.....	.....	.....	.....	1,477	1,477
Haiti	.....	1,200	.....	5	.....	.....	.....	1,205
Honduras	291	165	122	.....	.....	.....	.....	578
Jamaica	.....	2,522	4,080	113	1	.....	.....	6,716
Leeward Is.	.....	.....	.....	.....	.....	.....	527	527
Martinique	324	357	.....	.....	.....	.....	.....	681
Mexico	.....	950	.....	378	.....	.....	60,809	62,137
Neth. W. Ind.	.....	173	.....	.....	.....	.....	.....	173
Newfoundland	.....	778	.....	22	.....	.....	.....	800
Nicaragua	484	350	.....	.....	.....	.....	.....	834
Panama & C. Z.	.....	78	53	69	2	.....	497	699
Paraguay	3,670	16	.....	.....	.....	.....	.....	3,686
Peru	2,607	8,235	1,155	.....	59	.....	.....	12,056
Puerto Rico	1,200	.....	304	782	.....	.....	.....	2,286
El Salvador	.....	.....	.....	.....	.....	.....	1,605	1,605
Trinidad	.....	.....	.....	.....	.....	.....	2,335	2,335
United States	2,287,141	532,460	63,756	47,739	72,864	5,105	.....	3,009,065
Uruguay	20,317	1,395	603	106	60	6	.....	22,487
Venezuela	1,056	985	.....	5	165	.....	.....	2,211
Total	2,664,521	843,174	73,296	57,220	75,928	5,131	760 72,774	760 3,792,054

* City streets.
† Asphalt on concrete base.

EXCAVATING ENGINEER Bargain Counter

★ ★ ★ **THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.**

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45′ BOOM DRAGLINE Cats—15½′ long, 9′ wide, 22″ Treads. 100 HP. Waukesha High Alt. Engine. SCD-1.

AMERICAN 1 CU. YD. GASOLINE SHOVEL. Motor overhauled 1932. Good value. SCD-3.

P&H MODEL 600—40′ BOOM CLAMSHELL. Waukesha 75 HP. Engine. New 1929. Dragline and Shovel equipment also available. SCD-4.

ORTON ⅝ YD. GASOLINE SHOVEL. New 1928. Make an offer. SCD-5.

P&H MODEL 600. New 1929. 20′ Boom, 14′3″ Dipper Handle, 1 cu. yd. Dipper. Waukesha 75 HP. Engine. Dragline and Clam Shell Equipment also available. SCD-7.

BUCYRUS-ERIE MODEL 30-B DIESEL—25′9″ Boom, 14′ Dipper Handle, 1 yd. Dipper. SCD-9.

BAY CITY TRACTOR TYPE—CHAIN CROWD —⅜ YD. SHOVEL. Cat Mounted. McCormick-Deering Power Unit. Excellent condition. SCD-10.

MONIGHAN MODEL 1-W, WALKER — 60′ Boom Dragline, 1¼ cu. yd. Page Bucket. Good condition. SCD-13.

P&H MODEL 600—40′ BOOM DRAGLINE. Waukesha 75 HP. Engine. New 1929. Shovel and Clamshell Equipment also available. SCD-14.

BAY CITY TRACTOR TYPE CLAMSHELL. NEW 1928. Excellent condition. Shovel Equipment also available. SCD-15.

BUCYRUS-ERIE SLIGHTLY USED-LOAD-MASTER TRACTOR CRANE—14′ Boom—Rubber tired wheels—Rated lifting capacity 4500 lbs. McCormick-Deering Power Unit—New Machine Guarantee. SCD-17

COMPLETE FRONT END EQUIPMENT

Shovel Equipment

¾ CU. YD. DIPPER—23′ BOOM—15′ DIPPER HANDLE—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. Brand New. SE-2.

¾ CU. YD. DIPPER—23′ BOOM and ENGINE —12′6″ DIPPER HANDLE—Shovel Equipment suitable for 20-B Steam. Brand New. SE-15.

¾ CU. YD. DIPPER—26′ BOOM and ENGINE —17′ DIPPER HANDLE—High Lift Shovel Equipment suitable for 30-B Steam. Brand New. SE-16.

¾ CU. YD. DIPPER—25′9″ BOOM—14′ DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. Brand New. SE-17.

⅞ CU. YD. DIPPER—23′ BOOM—15′ DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment Complete suitable for Model 1030 or 1035. Rebuilt—New Equipment Guarantee. SE-22

⅞ CU. YD. DIPPER—21′9″ BOOM and ENGINE—15′ DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. Brand New. SE-18.

1 CU. YD. DIPPER—26′ BOOM—15′ DIPPER HANDLE—Rope Crowd Shovel Equipment suitable for Model D-2. Brand New. SE-3.

1 CU. YD. DIPPER—20′ BOOM—15′ DIPPER HANDLE—Rope Crowd Shovel Equipment, suitable for Osgood "Conqueror". Good mechanical condition. Low Price. SE-24

1 CU. YD. DIPPER—24′ BOOM—18′ DIPPER HANDLE—Slightly used but good conditioned. Suitable for any Bucyrus-Erie GA-2 or GA-3 Machine. SE-25.

1¼ CU. YD. DIPPER—25′ BOOM—17′ DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—23′6″ BOOM—15′ DIPPER HANDLE—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-6.

1½ CU. YD. DIPPER—27′ BOOM—17′ DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Equipment Guarantee. SE-23.

Clamshell Equipment

40′ BOX BOOM CLAMSHELL EQUIPMENT INCLUDING ROPES. Suitable for Model D-2. Brand New. CS-3.

Dragline Equipment

35′ CHANNEL BOOM, FAIRLEAD AND ROPES but not including bucket. For use on Model D-2. DL-2.

40′ CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-3.

40′ BOX BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-4.

45′ BOX BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-5.

40′ CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-6.

45′ CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-7.

40′ CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-8.

45′ CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Trench Digging Equipment

¾ CU. YD.—36″ WIDE SOLID TYPE DIPPER, 21′ Boom, and all auxiliary equipment for application to Model 1030. Will dig to maximum depth of 18′. DS-3.

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38″ wide over cutters, the other 49½″ wide over cutters. 17′1½″ Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

DIPPERS

Small Machines

2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New. D-12

1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New. D-13

1 ¾ CU. YD.—Rock type.—Will fit 30-B Gas or Diesel. Brand New. D-14

1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New. D-15

4 ¾ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-16

1 ¾ CU. YD.—Cast Front Inserted Tooth. Will fit 1030 or 1035. Brand New. D-17

2 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-18

1 ⅞ CU. YD.—Plate Front. Will fit 18-B. Brand New. D-20

1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New. D-21

1 1 CU. YD.—Rock type. Will fit D-2 or 31-B. Slightly Used. D-22

1 1¼ CU. YD. INSERTED TOOTH. Will fit GA-2 or GA-3. Slightly Used. D-25.

1 1¼ CU. YD.—Plate front. Will fit E-2, 41B or 42-B. Slightly Used. D-26

2 1¼ CU. YD.—PLATE FRONT. Will fit E-2. Brand New. D-27.

1 1½ CU. YD.—PLATE. Will fit E-2. Brand New. D-28.

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly Used. D-29

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C Machines. Brand New. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New. D-5.

3 6 CU. YD. Molybdenum Steel Front, Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition. D-6.

DRAGLINE BUCKETS

1 1¾ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 3,800 lbs. DB-7.

1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Rebuilt. Approximate weight 3,700 lbs. DB-8.

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Rebuilt. Approximate weight 6,500 lbs. DB-9.

1 2½ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 5,400 lbs. DB-10.

BOILERS

BRAND NEW

Will Make That Old Shovel Work Like New.

Can Also Be Used for Miscellaneous Service.

Vertical Type

9 36"x82½"—26 H.P.—142 lb. Working Pressure. Mass. Std. Will fit Type A. B-1.

4 42"x88"—35 H.P.—144 lb. Working Pressure. Mass. Std. Will fit Type B Shovel. B-2.

1 44½"x88½" fitted with extended fire box for burning wood. Can be used for coal or coke. 37 H.P.—144 lb. Working Pressure. ASME Std. Can be installed on Type B Shovel. B-3.

1 44½"x88½".—37 H.P.—145 lb. Working Pressure. Canadian Std. Will fit Type B Machine. B-4.

1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Special Wood Burning. Mass. Std. Will fit any B-2 or B-3 Machine. B-7.

2 46½"x88½"—37 H.P.—150 lb. Working Pressure. Mass. Std. Will fit B-2 or B-3 B-8.

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3 B-9.

1 54"x100"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11.

1 58"x7'9"—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine. B-12.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C B-14.

1 54"x9'7"—70 H.P.—125 lb. Working Pressure. Canadian Std. Will fit Model 50-B Machine. B-15.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

1 54"x18'—127 H.P.—140 lb. Working Pressure. ASME Std. Will fit Model 103-C B-17.

ELECTRICAL EQUIPMENT

MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW. EE-1.

50 KW MOTOR-GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW. EE-2.

COMPENSATOR—GENERAL ELECTRIC—75 HP., 2200 volt, 3 phase, 25 cycle, manual type. BRAND NEW. EE-3.

TRANSFORMER—GENERAL ELECTRIC — 5-KVA. 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW. EE-4.

GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 440 RPM. Includes two outboard bearings. BRAND NEW. EE-5.

MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycle, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW. EE-6.

LIGHTING PLANTS

1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 32 Volt. New. LP-1.

1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 110 Volt. New. LP-2.

1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 110 Volt. Used. LP-3.

1 1½ KW MOON TURBO STEAM GENERATOR—110 Volt Light Plant. Slightly Used. LP-5.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves — Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure, A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M.—Overall dimensions:—Height 45"—Length 87½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New. AC-1.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4 cylinders, 7" bore x 8½" stroke, 75 HP at 600 RPM, 4 cycle, Vertical—valve in head type. Includes radiator, fan and air cleaners. DE-1.

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—5-cylinder, 9" bore x 10½" stroke, 150 HP at 450 RPM, 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Full equipment. Also auxiliary air starting equipment. DE-2.

4 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—3-cylinder 6" bore x 8" stroke, 45 H.P. at 650 R.P.M., 4 cycle, Vertical—valve-in-head type. Includes radiator, fan and air cleaners. DE-5.

3 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4-cylinder, 6" bore x 8" stroke, 60 HP. at 650 RPM. DE-6

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 HP at 400 RPM. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 HP at 400 RPM. 100 lb. Pressure. ME-3.

2 5"x5" reversible—25.6 HP at 400 RPM. 100 lb. Pressure. ME-4.

1 "LITTLE TUGGER" INGERSOLL RAND STEAM HOIST ENGINE No. 1-H-5-2½ H.P. ME-5.

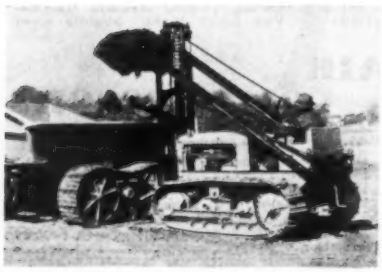
PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge—bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

Equipment You Ought to Know About

(Continued from page 31)

Hough-Allis-Chalmers Tractor Loader



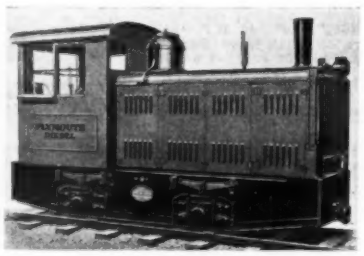
IN collaboration with Allis-Chalmers, the *Frank G. Hough Company* of Chicago has developed this new front end shovel-loader for the A-C Model "M" tractor. The tractor is equipped with special, wide gauge long track and track frames rigidly mounted to eliminate oscillating. All thrusts are taken on heavy channels supported on the track frame. The standard 1/3-yard bucket can be removed and a bull-dozer blade installed or a larger bucket can be used for handling snow and other light material. The units are hydraulically controlled.

For information write *Allis-Chalmers Manufacturing Company*, Tractor Division, Milwaukee, Wisconsin.

New Plymouth 12-ton Diesel Locomotives

PLYMOUTH Locomotive Works at Plymouth, Ohio, have just brought out two new Diesel locomotives, one of 8-ton and the other a 12-ton. Both of these are equipped with Caterpillar Diesel engines.

The 8-ton Plymouth-Caterpillar Diesel is powered with a 4-cylinder engine which develops 66 hp at 850 rpm. The 12-ton is equipped with a 6-cylinder Diesel developing 102 hp at 850 rpm. Features include a one piece frame built of steel plates. All joints are solidly welded and thoroughly braced against all strains. The clutch is of the dry-plate-type ruggedly and power-



fully constructed. It can easily be removed for servicing without interfering with or moving the engine or transmission.

Please mention *Excavating Engineer* when writing for information on new equipment.

There are four speeds forward and four speeds reverse. Semi-elliptic cross-equalized spring suspension is located outside the frame for easy accessibility and inspection. It is claimed that this construction permits traveling smoothly over rough and uneven tracks without danger of derailment. For complete information on these new units write *Fate-Root-Heath Company*, Plymouth Locomotive Works, Plymouth, Ohio.

Lufkin Drag Tape

9|0

A NEW steel tape, extra sturdy and designed especially for highway work, is offered by the *Lufkin Rule Company*, Saginaw, Michigan. This 5/16-inch chain tape is of special tough steel of extra weight and practically unbreakable. It is etched with graduations with black lines and figures in "Nubian" finish. The markings and figures are prominently and deeply cut into the line itself. They will remain clear after much dragging of the tape. The tape is graduated to feet with end feet in tenths. It can also be had with extra feet before zero to tenths. It has heavy brass end clips and a pair of rawhide thongs and is made in lengths of 100 to 300 feet. Furnished with or without reel. Circulars will be gladly sent by the manufacturer.

(Continued on Page 60)

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

DRAGLINE-SHOVEL OPERATOR

10 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U. S. A. Also have 2 years' machine shop experience. Can do own repairing and furnish A-1 references. Present location Florida. Box 5702.

SHOVEL OPERATOR

Ten years' experience on Steam, Gas+Air and Electric Shovels on road and quarry work. Can do own repairing and furnish excellent references. Married. Present location Virginia. Box 6100.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

ENGINEER-SUPERINTENDENT WANTS CONNECTION WITH CONTRACTOR

Twenty years' exceptional experience in factory construction, rock work, roads, dams, tunnels, hydro-electric developments, foundations. Has produced results under difficult conditions and can handle large program in whole or part. Eight years Latin America. Go anywhere. Box 5102.

SUPERINTENDENT

20 years operating and in charge of heavy strip mine and quarry equipment. 45 years of age. Can furnish references from any former employer and the largest manufacturer of excavating equipment in America. Can take full charge on reasonable notice. Box 5901

OPERATOR-QUARRY FOREMAN

Have 25 years experience operating steam, electric and gasoline shovels and draglines on all classes of work. Can do own repair work. Also experienced quarry foreman with very best references. Married but willing to go anywhere. Present location Kentucky. Box 6200.

EXPERIENCED DRAGLINE OPERATOR

Fifteen years experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5903

OPERATOR

With 26 years experience on Monighan, Bucyrus-Erie and other makes on all kinds of projects. Can do own repair work and furnish good references. Willing to go anywhere. Present location Illinois. Box 5905.

DRAGLINE OPERATOR

25 years experience on steam draglines on construction work. Prefer operating dragline. Can do own repair work. Reliable references furnished. Present location, Indiana. Box 5701.

SHOVEL OPERATOR

5 years experience on Lorain, Northwest, Osgood, and Bucyrus-Erie Gas, Diesel and steam machines. Can do own repair work. Single and willing to go anywhere in U. S. A. or Foreign countries. Can furnish excellent references. Box 5904

SHOVEL OR DRAGLINE OPERATOR

Experienced operator on drainage, stripping, highway and levee construction. Machines from 1 to 8 cubic yard. Last five years on gas machines. Can do own repair work. Best references. Single. Present location Louisiana. Box 5601

TRANSITMAN—OFFICE WORK

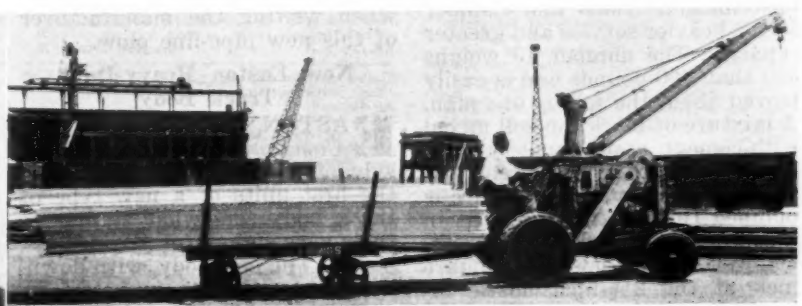
Experienced transitman with mining experience desires transit work, or will work as rodman, chainman or engineer's helper. Have also had experience as timekeeper, and much experience in safety work. Good references. Located Wisconsin, will go anywhere. Box 3513.

DOWN go handling costs

A trenching job in New York . . . no traffic tieup . . . the Loadmaster moves in a six-foot lane. Sewer and water work in New Orleans . . . stock carried and placed safely and conveniently. Stock piling material in St. Louis . . . the Loadmaster hauls as well as loads and unloads. There are always money saving jobs for it to do . . . no expensive rehandling!

This handy crane lifts, carries, places and hauls . . . it pays profits by cutting handling costs in a hundred ways. Often it will handle work for which you might consider a heavier and more expensive crane. Because of its compactness and mobility it does many things larger cranes cannot do.

Operated by one man . . . first cost is reasonable . . . operating costs low. Wheel or crawler mounting. In many cases this indispensible unit has paid for itself in sixty to ninety days. Get the facts . . . no obligation . . . it will pay you to investigate. Write for bulletin.



BUCYRUS ERIE

BUCYRUS-ERIE CO.
SOUTH MILWAUKEE, WISCONSIN

LOADMASTER

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

Equipment You Ought to Know About

(Continued from page 58)

Thor Pneumatic Sump Pump

INDEPENDENT *Pneumatic Tool Company* of 600 West Jackson Boulevard, Chicago, have recently announced a new portable air-operated pump with a capacity of 230 gallons per minute at 90 pounds pressure and 10 feet of water or 100 gallons at 70 feet. No priming is required as the pump is designed to run partly or fully submerged. Construction is one piece forming a self-aligned compact or sturdy unit. Wear due to sand and abrasive dirt in water is minimized by the impeller being of the closed type which also increases the capacity of the pump. A variable speed throttle controls the speed and capacity and a governor controls the motor from over speeding. The unit is 20 inches in length and weighs 48 pounds.

National Equipment's Mud-Jack

THE *National Equipment Corporation* of North 30th Street and West Concordia Avenue, Milwaukee, offer their new Mud-Jacks in two sizes, number 10 for use in raising concrete curbs, gutters, walks, street pavement and miscellaneous slabs and number 50 for heavier service and greater capacity. The number 10 weighs less than 400 pounds and is easily moved about the job by one man. A mixture of black top-soil mixed with cement, approximately 20 to 1, is used at the consistency of cream or mortar. This mixture is pumped through holes drilled in the slab at a pressure of approximately 100 pounds per square inch at the 2½-inch nozzle directly below the pump. This fills the voids and raises the project to the original grade. Complete information and bulletin will be gladly furnished by the manufacturer.

Pipe-Line Plow

DESIGNED especially to facilitate the laying of oil and gas pipe-lines, a new plow has just been announced by *R. G. Le Tourneau, Inc.*, of Stockton, California, manufacturers of heavy earth-moving equipment.

The plow was developed at the request of Bechtel-Kaiser Co., Ltd., and Henry J. Kaiser Co., who have the contract for laying 216 miles of natural pipe-line from Douglas to Phoenix, Arizona. It consists of two plow shares, both throwing furrows to the center, an elevating moldboard, and a side wing or blade for disposing of the earth, the whole mounted on a wheeled frame in such manner that the depth of the furrow taken can be controlled by cable from the power control unit mounted on the tractor.

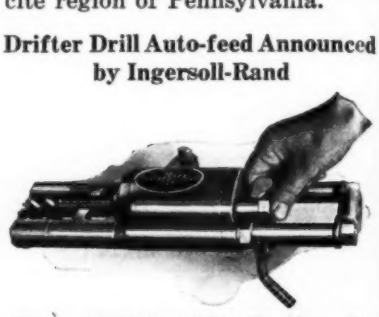
The new tool will dig a thirty-inch trench in three cuts, depositing the earth taken out about six feet to the right of the center line in easy position for back-filling. The position of the side wing is variable and can be controlled independent of the plow shares. The plow leaves the sidewalls straight and unbroken and is readily handled by a 75 horsepower tractor in high gear. Please mention *Excavating Engineer* when writing the manufacturer of this new pipe-line plow.

New Easton Heavy-Duty Truck Body

EASTON *Car & Construction Company* of Easton, Pennsylvania, are now constructing the first units of a new type of truck body somewhat similar to their very successful "Won Way" bodies. The new body, with down-dropping tail gate is being designed especially for use in heavy contracting work. The first units are being placed in service by a contractor who has a number of coal stripping jobs in the anthracite region of Pennsylvania.

Please mention *Excavating Engineer* when writing for information on new equipment.

Drifter Drill Auto-feed Announced by Ingersoll-Rand



AN AUTOMATIC feeding device for drifter drills known as the Auto-feed, has been introduced by *Ingersoll-Rand Company*, 11 Broadway, New York City. It derives its action from the natural tendency of a running drill to creep when the feed screw is allowed to turn in only one direction. The direction of feed can be reversed by throwing a conveniently located lever. A brake permits retarding the rate of feed or stopping it entirely. When the drill is not running, it can be freely moved in the shell.

When starting a hole, the operator feeds the drill up to the rock face slowly by opening the air throttle partially. When the bit reaches the rock, he opens the throttle further. In even ground, after the hole is collared, he need pay no more attention to the drill until a change of steel is necessary; in broken or fitchery ground, by proper manipulation of the Auto-feed, he is able to put in holes easily where it would be extremely difficult or sometimes impossible to do so with the hand crank. By reversing the direction of rotation, the drill will automatically run back. This reduces the time required to change steels.

Advantages claimed for the Auto-feed are: Greater over-all footage per man shift; better control of the drill in fitchery ground; it pulls tightly held steels that are difficult or impossible to extract by hand cranking; it will operate in close quarters and permits placing edge holes where blasting will prove most effective. Drills equipped with Auto-feed are but slightly longer and heavier than hand-cranked models. There is no increase in air consumption. The construction is simple and upkeep cost is low. For complete information write Ingersoll-Rand Company, mentioning *Excavating Engineer*.

Trade Notes

Charles F. Norton, formerly Vice-President and General Manager of the Howell Electric Motors Company, has recently been appointed General Sales Manager of the **Louis Allis Company**, Milwaukee.

Wooldridge Trailbuilders and Bulldozers, long established in the National Parks, Forestry Service, and Western lumber camps, are now manufactured and distributed by the **Continental Roll and Steel Foundry Company**, Industrial Equipment Division, 332 South Michigan Ave., Chicago, Illinois, for practically all makes of tractors.

F. H. Hopkins and Company Limited is the new name for the well known equipment house of Montreal and Toronto, formerly Hopkins-Osborn Limited. The change in name follows C. V. Osborn leaving the firm last August. The new name is the same under which the organization operated for many years prior to 1931. F. H. Hopkins and Company Limited will continue to sell shovels, locomotives, cars, cranes, pile drivers, crushers and other equipment required by railroads, contractors, mines and municipalities. The head office remains in the Dominion Square Building, Montreal, with the branch office in the Commerce and Transportation Building, Toronto, under direction of W. J. Knox. S. A. Stephens is President of the company, J. H. Alexander, Vice-President, Secretary-Treasurer.

CLIFFORD F. MESSINGER

Death came suddenly on the night of December 12th to Clifford F. Messinger, President of Chain Belt Company, at his home in Milwaukee. Apparently in excellent health he spent the day at his office and was reading comfortably at home when the fatal heart attack came at 11:00 p. m.

Mr. Messinger was born in New Haven, Connecticut, September 9, 1889, graduated from S. S. S., Yale, in 1911 and entered the service of Chain Belt in Milwaukee the same year as a college apprentice. In 1913 he became advertising manager and then successively sales manager, general manager, vice-president and president in 1930. He was also a director of the Chain Belt Company, Interstate Drop Forge Company, Sivyer Steel Casting Company and Federal Malleable Company, all of Milwaukee, and president and director of the Stearns Conveyor Company of Cleveland.

Mr. Messinger is survived by his wife, four children and a brother, C. Raymond Messinger of Chicago, President of the Oliver Farm Equipment Company.

Book Reviews

Metropolitan Life Insurance Company of One Madison Avenue, New York, have prepared a booklet entitled "Silicosis" for the information of executives, plant superintendents and foremen in departments where silica dust is present. A limited number of these booklets are available to readers of Excavating Engineer. If you are interested write to Industrial Health Section, Metropolitan Life Insurance Company at above address.

The Portland Cement Association of 33 West Grand Avenue, Chicago, have recently published a very attractive book entitled "Concrete Road Design." The material was prepared by Frank T. Sheets, Consulting Engineer of the Portland Cement Association, and fills the need of highway engineers for easy, accurate and rapid methods of design of concrete slabs to meet traffic needs. The booklet should be of immediate value to all interested in the study and design of highways and pavements. Copies of this 61-page, 6x9 booklet may be obtained by writing the Portland Cement Association.

In a twelve-page, 6 by 9 folder, **American Road Builders' Association** presents a committee report on **the Construction and Performances of Reinforced Concrete Pipe Culverts.** A number of diagrams are used for the benefit of the reader. Refer to Bulletin No. 38.

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

BUCYRUS ERIE So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT

FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ **Osgood 1½ yd. Steam Shovel — Bargain.**
- ☐ **P & H 600 1-yd. Shovel-Dragline.**
- ☐ **Industrial—Brown Hoist — 8 Wheel 50' Boom Steam Crane.**
- ☐ **Bucyrus-Erie 1030 —Gas ¾ yard shovel. Rebuilt.**
- ☐ **Bucyrus-Erie 41-B steam 1¼-yd. Shovel. Good condition. Very low price.**
- ☐ **Monighan Dragline 60-foot boom. Priced right.**

Name .....

Address .....

P. & H. MODEL 206 Gasoline Combination Shovel and Clamshell machine. Good condition. Located vicinity Chicago. **Box 336-SS.**

20-B BUCYRUS-ERIE STEAM SHOVEL, serial number 4000; caterpillar mounted; 18-foot boom, 12-foot 6-inch dipper handle, 1-yard dipper; shipped new in 1923; located western Missouri. Bargain. **Box 241-SS.**

THEW "O" ¾-cubic-yard gas shovel rebuilt 1931 and mounted on new center drive "cat". **Box 343-SS.**

Marion Type 32 Steam Shovel, Shop No. 5676, 18' boom, 15' dipper handle, 1¼ cu. yd. dipper, shipped May, 1926, good operating condition. **Box 451SS.**

CHEAP!

Two 20-B Bucyrus steam shovels. Located Aurora, Illinois. Price each $1500.

30-B Bucyrus steam shovel. Located Charleston, Mississippi. Price $1500. **Box 303-SS.**

MARION MODEL 32, shop No. 5459, mounted on "cats," steam-powered, 1¼-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles. **Box 82-SS.**

BUCYRUS-ERIE TYPE "GA-2" GAS+AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. **Box 126-SS.**

ONE TYPE "B" BUCYRUS-ERIE STEAM MACHINE, mounted on "cats", ¾-cubic-yard dipper, shop number 2301, 19-foot boom and 16-foot dipper handle. **Box 83-SS.**

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. **Box 381-SS.**

USED P&H MODEL 700 gasoline, combination shovel-dragline, shop number 3007, including 1¼-cubic-yard drag scraper bucket. Dragline boom 40-foot plus 10-foot extension, shovel boom 25-foot 10-inches, dipper handle 19-foot 3-inches, dipper 1¼-cubic-yard. Engine Waukesha Type WL 4 cylinder 6¼"x7". Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. **Box 378-SS.**

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

BUCYRUS-ERIE SLIGHTLY USED ½-CUBIC YARD Rope crowd gasoline shovel. Will demonstrate. Box 282-SS.

REBUILT GA-2 BUCYRUS-ERIE SHOVEL mounted on single shaft caterpillar, 1¼-cubic yard inserted tooth dipper, 22-foot 6-inch boom, 16 foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS

BUCYRUS-ERIE 20-B steam shovel ¾-yard Dipper. $600.00. Chicago territory. Box 348-SS.

TWO TYPE B BUCYRUS-ERIE STEAM SHOVELS. Good operating condition. $1000 each. Box 328-SS.

ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on full revolving caterpillars. Box 182-SS.

BUCYRUS-ERIE-GAS-AIR-SHOVEL—22' 6" Boom—16' Dipper Handle—1 cu. yd. Dipper—Single Shaft Cat. Located Canaan, N. Y. Good operating condition. Box 455 SS

NORTHWEST SHOVEL, model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

P&H MODEL 204. Shop number above 2200 combination Shovel Clamshell. 19' shovel boom, 14' 6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 254-SS

BYERS BEARCAT, Model 27, gasoline ½-cubic-yard Skimmer scoop, crane-clamshell and drag shovel with front opening dipper. Engine—4-cylinder, 4"x5" Hercules Model OX. Machine new July 1928. Excellent condition. Box 293-SS.

TYPE B BUCYRUS-ERIE COMBINATION HIGH LIFT STEAM SHOVEL, 19-foot 8-inch boom, 16-foot dipper handle, ¾-cubic yard dipper, power boom hoist and 36-foot boom clamshell equipment complete. Located central Indiana. Price as is, f.o.b. present location $2,000. Box 311-SS.

BROWNING STEAM LOCOMOTIVE CRANE, 20 ton capacity, 50 foot boom.

BUCYRUS-ERIE GAS + AIR CRANE with 40-foot boom, ¾-yard Page Dragline bucket. Fairleads and shovel boom, no dipper stick. Machine No. 4347.

Box 373-SS.

BUCYRUS-ERIE 1030, ¾-cubic-yard rope crowd gasoline shovel. Factory rebuilt and guaranteed. Box 283-SS.

TYPE B-2 BUCYRUS-ERIE STEAM SHOVEL, number 9830, mounted on single shaft caterpillar type mounting. Equipped with 21-foot 3-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper. Boom hoist and Mass. standard boiler. Located vicinity of Boston. Reasonably priced. Box 345-SS.

BUCYRUS-ERIE GAS+AIR Combination high lift shovel and dragline equipment. Chain drive. "Cats." Very good condition. Located vicinity Chicago. Box 337-SS.

BUCYRUS-ERIE TYPE B High Lift Steam Shovel, Power Boom Hoist. Good condition. Box 425SS.

BUCYRUS-ERIE GA-2 High Lift Shovel—22'6" Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, four cylinder 6¼"x8" Engine, Single Shaft Cat. Shop reconditioned. Bargain price. Box 426SS.

BUCYRUS-ERIE D-2 Diesel High Lift Shovel—26' Boom, 17' Dipper Handle, 1 cubic yard Dipper, Atlas four cylinder 6½"x8½" Engine. Excellent condition. Box 428SS.

AMERICAN Gas Shovel—21' Boom, 15' Dipper Handle, 1 cubic yard Dipper, Waukesha four cylinder 6"x7" Engine. Bargain price. Box 429SS.

BAY CITY Chain Crowd Gas Shovel—15' Boom, 11' Dipper Handle, ⅜ cubic yard Dipper. Also 25' Boom Clamshell Equipment and ⅜ yard Clamshell Bucket. Excellent operating condition. Bargain price. Box 430SS.

BYERS BEARCAT Gas Shovel—16' Boom, 12' Dipper Handle, ⅜ yard Dipper, Hercules Gas Engine. Also 30' Boom Dragline Equipment. Good mechanical condition. Price right. Box 431SS.

P&H MODEL 208—45' Boom Dragline—100 HP Waukesha Gas High Altitude Engine. Good operating condition. Box 432SS.

P&H MODEL 207—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433SS.

P&H MODEL 600 Gas Shovel—20' Boom, 14'3" Dipper Handle, 1 cubic yard Dipper. Also 40' Boom Clamshell and Dragline Equipment available. 75 HP Waukesha Gas Engine. Bargain price. Box 434SS.

KOEHRING MODEL 1 Gas 30' Boom Crane—4½"x5" Wisconsin Engine. Box 435SS.

OSGOOD Steam Shovel—21'9" Boom, 16' Dipper Handle, 1½ cubic yard Dipper. Good operating condition. Box 436SS.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wisconsin

BUCYRUS-ERIE MODEL 32-B Gas Chain Crowd Shovel—21' 6" Boom, 16' Dipper Handle, ⅞ yard Cast Front Inserted Tooth Dipper, Wisconsin six-cylinder 5"x6" Engine. Excellent condition. Box 422SS.

LORAIN 75-B Shop No. approximately 5000—21' Boom, 18' Dipper Handle, 1¼ cubic yard all cast Dipper, automatic Dipper Trip, Standard center drive Cat, Power Boom Hoist, four cylinder Waukesha 6¼"x8" Gas Engine. New July, 1930. Located Strawn, Texas. Excellent mechanical condition. Box 441SS.

HIGH LIFT TYPE B-2 steam shovel No. 3867 mounted on caterpillars and equipped with 19'9" boom, 16' dipper handle, ⅞ cu. yd. inserted tooth dipper, two speed, heavy counterweight, and boom hoist. Located in New York State (at or near Pine Bush). Would accept any reasonable offer. Box 448 SS.

TYPE GA-2 SHOVEL NO. 10937 mounted on single shaft caterpillar mounting and equipped with 24' boom, 16' dipper handle, 1¼ cu. yd. inserted tooth dipper, electric starter and boom hoist. Located in Massachusetts—now working. Can be purchased at very low price. Box 445 SS.

TYPE GA-2 SHOVEL NO. 9774 mounted on caterpillars and equipped with 24' boom, 18'4" dipper handle, 1 cu. yd. inserted tooth dipper, and air starter. Located in Massachusetts—now working. Can be purchased at very low price. Box 446 SS.

INDUSTRIAL BROWN-HOIST MODEL "H"—50' Boom Steam 8 Wheel Locomotive Crane—50,000 lb. capacity. Good operating condition. Located vicinity Chicago. Box 442SS.

P&H MODEL 600—1-yard Gasoline Shovel. Three years old. Excellent condition throughout. Just been thoroughly overhauled. Will sacrifice at bargain to responsible buyer. Located in Wisconsin. Box 363-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21 foot boom, 15 foot dipper handle, 1¼ cu. yd. dipper. Good operating condition. Box 406-SS

Small Draglines
Under 2 Yards

BUCYRUS-ERIE D-2—Atlas Diesel—45' boom dragline and 1 cu. yd. Page bucket. Cat mounted. Good operating condition. Located near Lake Providence, Louisiana. Very attractive price. Box 450-SD.

BUCYRUS-ERIE D-2 DIESEL—40' Boom Dragline, used on light work about 6 months since rebuilding. Excellent condition. Located Central Ohio. Box 448 SD.

BUCYRUS-ERIE—REBUILT 45-B Gas—65' Boom Dragline. LeRoi six cylinder 6½"x7" Gasoline Engine. 1½ KW Kohler Light Plant installed. New Machine Guarantee. Box 456-SD.

MONIGHAN 60 FOOT BOOM DRAGLINE mounted on 1-W walking device—Waukesha 5¾x8, 4 cyl. gas engine, also 1¼ yd. Page bucket. Good operating condition. Box 408-SD

P & H Model 206 B Dragline. Good operating condition. Very favorably priced. Box 390-SD.

BUCYRUS-ERIE GAS+AIR combination high lift dragline and shovel. Chain drive. "Cats." Excellent condition. Located vicinity Chicago. Box 337-SD.

BUCYRUS-ERIE E-2 DIESEL DRAGLINE, caterpillar mounted, 50-foot boom, 1¼-cubic-yard Omaha bucket, Kohler lighting plant. Machine was new in July 1930 and has been used less than 6 months. Box 248-SD.

P&H MODEL 700 USED GASOLINE COMBINATION DRAGLINE SHOVEL, shop number 3007, 40-foot dragline boom plus 10-foot extension and 1¼-cubic yard drag scraper bucket. 25-foot 10-inch shovel boom, 19-foot 3-inch handle and 1¼-cubic-yard dipper. Waukesha Type WL 4 cylinder 6¼"x8" engine. Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SD.

P&H MODEL 208—45' BOOM DRAGLINE—7¾"x9" four cylinder Twin City Gas Engine, 1¼ cu. yd. Omaha Bucket included. Box 460-SD.

P & H MODEL 700 DRAGLINE; number 2894 equipped with a 50 foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

P & H DRAGLINE MODEL 700; number 2456 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

MONIGHAN BRAND NEW—40' Boom Dragline. Cat Mounted, Waukesha four-cylinder 6½"x7" Gasoline Engine, 900 R.P.M., 93 H.P. Electric Starter, Steel Cab. Exceptional Value. Box 453 SD.

P&H MODEL 600 GAS DRAGLINE. 40 foot boom. 75 HP. Waukesha gas engine. Also available clamshell equipment; shovel equipment with 20 foot boom, 14 foot 3 inch dipper handle and 1 cubic yard dipper. Bargain price. Box 434SD.

BUCYRUS-ERIE 30-B Diesel—40' Boom Dragline Box 437SD

BYERS BEARCAT GAS DRAGLINE with 30 foot boom. Hercules gas engine. Also shovel equipment including 16 foot boom, 12 foot dipper handle and ¾ yard dipper. All in good mechanical condition. Price right. Box 431SD.